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Inter-Organizational Social Network Information Systems: Diagnosing and Design

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Inter-O rganizational Social Network Information Systems: Diagnosing and Design

by

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A dissertation submitted in partial fulfillment of the requirements for the degree of
Doctor of Philosophy
Department of Information Systems and Decision Sciences
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While IS research into on-line Inter-Personal (IP) Social Networks (SN) is highly visible, there has been surprisingly little focus on the use of on-line social networks for Inter-Organizational (IO) communications, interactions, and goal achievement. We explore the issues and challenges facing organizations in their design and use of inter-organizational social network information systems (IO SNIS). Artifact design principles are drawn from a new and insightful model that contrasts the advantages of existing innovative inter-personal (IP) SNIS artifacts with Social Network Theory on differences between IP and IO Social Networks. This research extends the existing streams of IS social networking research into the inter-organizational domain and encourages additional IS research into the analysis, design, and build of artifacts that animate the social behavior of organizations. We develop a key design concept for IO SNIS and establish the design principles underlying the general artifact design and the specific design features that apply the design constructs to an exemplar IO social domain. This dissertation uses Action Design Research (ADR) approach within the Design Science Research (DSR) paradigm to formulate the research opportunity and anticipate a practice-inspired and theory-ingrained artifact. The researcher works with a practitioner team in the domain of mid-market private equity (MMPE) to explore the model and evaluate existing on-line inter-organizational artifacts to establish specific design features for an IO SNIS artifact. We find that the design principles can generalize from the IO SNIS Design Concept Model to other IO Social domains and that the design features can be used to build an instantiation of IO SNIS in the Private Equity domain.
CHAPTER 1: INTRODUCTION

This dissertation examines online Social Network Information Systems (SNIS) to prospectively anticipate how the innovative SNIS artifact might affect Inter-Organizational (IO) Social Networks (SN). We seek to anticipate the challenges and network effects on organizations considering the adoption of IP SNIS artifacts and to inform IS researchers and practitioners of the key IS design elements (principles and features) that should be considered when developing and implementing IO SNIS. We take an IS design science approach that seeks to “exapt” from research on IP SNIS artifacts (such as Facebook and LinkedIn) to anticipate an ensemble IO SNIS - an innovative artifact not currently discussed in academic literature or fully executed in practice. We extend Social Network Theory (SNT) to the digitally enabled social network domain of SNIS to develop hypotheses of the effect on IO SN actors and their whole networks of this rapidly growing IS instantiation (SNIS). We use an Action Design Research (ADR) Method to conduct research in situ that supports practitioners pursuing solutions to the online replication of offline inter-organizational social network behavior. We use the ADR approach to generate new knowledge – specifically a model of generalizable design principles and domain specific design features - that advances theory in the Design Science Research (DSR) discipline. From observations of innovative artifacts and Social Network Theory, we are able to induce a new class of artifacts – IO SNIS – and a theoretical model for the design of that type of innovative artifact. We use the interpretive research approach of ADR to combine (1) the DR focus on innovative artifacts that are relevant because they actually solve IT problems facing practitioners
and (2) the Action Research (AR) focus on testing the theory in the complexity of a specific organizational context for a target domain needing to solve the class of problem (online inter-organizational social behavior). We seek to inform IS researchers and practitioners alike of the key IS design elements that should be considered when developing and implementing IO SNIS and the critical Inter-Organizational Social Network effects if/when SNIS with Organizations as Users (OAU) occur.

This dissertation creates an entirely new stream of IS research in the digitally embedded social network streams of research first described by Agrawal et al (2008). We work in accordance with Gregor and Hevner’s (2013) research to extract design theory from this design science research through reflection and abstraction (inherent in ADR) as we explore our key design concept – IO SNIS – from a general to a fully elaborated model with specific and generalizable design features.

Finally, we position the resultant design in the ADR process to inform the build, implementation and evaluation of an IO SNIS artifact.

1.1 MOTIVATION

Being human we are social animals. Technology development (smoke signals, letters, telegraph, telephone, televideo conferencing, on-line social media) over the course of human history has taken human social interaction from the synchronous face-to-face to the asynchronous online instantiations of digitally embedded social networks called social networking information systems. And, we are not only social as individuals on an inter-personal level. We also get together in groups and organizations and create networks of inter-organizational social behavior. Social actors in networks can be individuals and organizations.
Qualitative and quantitative studies of IP SNIS identify several socio-technical design elements inherent in these online platforms that motivate individuals to their adoption. In principle, these elements offer similar advantages to organizations that look to replicate offline social networks in an online digital domain. IO SNT literature provides evidence of the paradoxes facing organizations participating in social networks. Offline SN studies demonstrate that IO Social Networks are fundamentally different from IP SN in several important ways. Specifically, Organizations interact in IO SN where (1) the organizing purpose is a desired economic outcome (Casson and Cox 1997, Grandori and Soda 1995, Aldrich 1990), (2) inter-organizational interaction is strongly restricted by concerns for competitive advantage and mitigating the risk of competitive information sharing or visibility (Ebers 2007, Casson and Cox 1997, Thorelli 1986), and (3) efficiency (measured in terms of social capital increase) derived from any supporting platform is weighed against the need for resilient trust among potential organizational partners (Ring 1996).

A fundamental difference to IP SN is that IO collaboration is a function of resilient trust where reciprocal exchanges produced in SN interactions are stronger than negotiated contractual agreements (Ring 1996, Grandori and Soda 1997, Newell 2000) but when competitive risks are high (i.e.: to resource imitability, sustainability, or mobility) the partner’s trustworthiness must be “near-absolute” (Ring 1996). In these cases, the trust is by definition more resilient if the partners choose to interact or non-existent if they do not pursue reciprocal exchange. (Molm et al. 2009; Ring 1996) IO SN efficiency increases for the network and its actors when a variety of social capital measures increase including the number of members, contribution of resources, and frequency of participation. In IO SNIS, however, uncontrolled network efficiency (i.e.: see Barabasi’s 2009 discussion of “scale-free growth”) may create ties (connectivity) to low trust
partners. The result is a reduction in the quality of the interactions (decision-making participation, helpfulness, trustworthiness, and fairness of actors, volunteerism, and trust in neighbors) that will tend to lower network effectiveness. (Narayan & Cassidy, 2001) Ultimately, success for any organizational actor is measured in terms of the desired economic outcome. IO SNT suggests that those outcomes will most likely occur for organizations when they efficiency and effectively improve the organization’s social capital predominantly with neighbors where reciprocal resilient trust is existent.

Thus, research into IO SN behaviors suggests that a direct copy of IP SNIS for an inter-organizational environment will lead to “unexpected effects” that lower the probability of participation. On the other hand, if important differences in motivations for organizational participation in social networks are well understood they might be used to anticipate the negative impacts of unexpected effects and offer a means to modify key design elements. The suggestion for the IS researcher expecting to prospectively “exapt” key socio-technical design elements from IP SNIS to IO SNIS is that those elements that make the SNIS platform fundamentally different environment for IP SN interaction (see Table 1) must be evaluated for their “unexpected effects” on IO SN.

Inter-organizational (IO) SNIS is an important IS research topic because Information Systems behavioral and design science research is constantly seeking to explain and create innovative IS artifacts that use information systems to facilitate human behavior (Simon 1996). IP SNIS as IT Artifacts are unparalleled in the rapidity of their diffusion. (Grossman & Stengel 2011) Organizations are already experimenting with IP SNIS in the enterprise to improve organizational performance. (Brzozowski 2009, Wu 2010, Forrester 2010) Real-time, large-scale social network participation analysis is possible with SNIS that has not been feasible with
physical social networks historically. And SNIS generate data that allows longitudinal network analysis and analysis of network interactions and structures that can be evaluated against real-time organizational performance. (Mislove et al 2007, Ahn et al 2007)

IP SNIS are generating billions of dollars globally in economic activity through millions of regular individual users in areas that include advertising, paid memberships, licensing and information systems development and deployment. By way of example, two prominent IP SNIS, LinkedIn and Facebook, have installed bases of 141 million and over 187 million individual users monthly ranking them in the top six digital media properties by audience. (comScore Media Metrix Multi-Platform, U.S., March 2013) With over 200 million organizations globally and business spending comparable to consumer spending annually, the economic opportunity afforded a “facebook of organizations”, an IO SNIS, could compare favorably to IP SNIS today.

Facebook was one of the last in a long string of attempts by software designers and developers seeking to replicate the offline social behavior of individuals in the online environment of the web. Facebook succeeded where others failed by taking full advantage of the unique features of the online environment (efficient connectivity, digital proximity, algorithms) while creating features that “spoke” to individuals needs to “look at, look up, and keep up” with others, encouraged transparency in self-presentation, and promoted connectivity growth above all. Facebook’s success in the face of so many other failures is attributed to the insight of its founding team and good fortune in their initial IP SNIS design. Facebook founders are the first to acknowledge that from their dorm room they did not survey the literature, study all of the competitors, understand social network theory, or capitalize on any of these to create Facebook. Were they lucky or good or both? Was it by “accident” or by design? If you are the next
designer of an ensemble online social artifact can you afford trial and error and hope to get “lucky”? 

This line of IS research investigates the strategic use of an innovative information technology to affect existing organizational structures and to facilitate new forms of inter-organizational interaction. Agrawal et al (2008) identified five streams of IS research in what they called “digitally embedded social networks” and we term SNIS. This article extends their research through the addition of an Inter-Organizational focus and updates the referential literature located in each stream. This article also addresses their recommendation that IS research take a prospective versus post hoc look at the SNIS domain as we intend in this dissertation.

There is an identified gap in IS literature surrounding the application of SNIS in the IO SN domain in spite of the existence of several IS solutions for inter-personal social connectivity (Mullarkey 2012) and to our knowledge has not been explored in academic literature to date. SNIS possesses reasonably high solution maturity in its IP application from a DSR knowledge perspective after 24+ instantiations and 1 billion plus users of the largest instances. But, SNIS has low (non-existent) application domain maturity in its IO instantiation. Consequently, this research also explores IO SNIS from the perspective of the “Exaptation” quadrant with Low Application Domain Maturity and High Solution Maturity of Gregor & Hevner’s (2013) DSR Knowledge Contribution Framework.

1.2 RESEARCH QUESTIONS

Early in our research we identified that information system designers and developers seeking to create an ensemble artifact that enables inter-organizational social behavior online have yet to create the Facebook of IO SNIS. This is true in spite of the belief of the vast majority of CEOs,
Presidents, and Managing Directors (Sloan, p. 3) that social information systems are important to business performance – especially “for external-facing activities.” It is true in spite of the evidence that inter-organizational social networking is critical to many aspects of business performance and success (Casson & Cox 1997). In fact, in inter-organizational domains where IO social networks are important to success, the organization’s position in the network is more important to achievement of its goals than the specific characteristics of the organization. And, IO social networks exist because they provide long-term, non-contractual, reciprocally beneficial interactions based upon resilient trust that avoid the high cost interactions of low trust, contractual inter-firm networks.

It is puzzling that some eighteen years (or more) into the global adoption of IP SNIS, no similar information system to replicate inter-organization social networking exists on a ubiquitous, global basis. In spite of the fact that the wherewithal to readily copy the features of the most successful IP SNIS exists, over the last two decades, or so, organizations have failed to define, design, build, and implement Inter-Organizational Social Networking Information Systems (IO SNIS).

Our research suggests that organizations are drawn to utilize SNIS for inter-organizational social networking because of a number of advantages to social network growth and actor interaction that occur with these online social artifacts. Our research also suggests that organizations are steering clear of these forms of SNIS because of some very specific characteristics of inter-organizational social networks that make them inherently different from inter-personal social networks. Our goal is to explore this duality that at once attracts organizational interest in and repels participation in the design, build, implementation and adoption of SNIS for inter-organizational social networking.
This research takes the approach that IS Design researchers working closely with practitioners in the chosen artifact class and in the complexity of a specific business domain can solve current and anticipated IS problems like IO SNIS. We use an ADR research method that emphasizes a collaborative, iterative approach to the co-creation of design principles and features for an emergent artifact. We modified the ADR method slightly to emphasize the need to focus on the Problem Formulation and Design phases of ADR when considering an emergent artifact before delving into the Build and Evaluation phases of ADR.

The problem formulation phase forced us to ask two questions:

- Why are IP SNIS successful? What are the design principles that make them attractive to users? What are the key features afforded by technology online that differ from the offline features of social networks?

- How are IO social networks fundamentally different from IP social networks? What design principles must be accounted for in IO SNIS design? What IP SNIS features will be desired by users of IO SNIS?

We used knowledge of innovative IP SNIS technologies and research on IO SN to hypothesize the key design principles of an IO SNIS artifact. We developed the IO SNIS Design Principles Model to juxtapose design principles of successful IP SNIS against design principles of successful IO social networks. Action researcher and action practitioner then used the model as a framework in an iterative process of reflection and learning that lead to the guided emergence of twelve design features essential to a successful IO SNIS ensemble artifact.

The fully Elaborated IO SNIS Model was then compared to existing online IO networking sites that possessed one or more social tools. The analysis of the data showed the gap between each
of the networking sites and a full featured ensemble social networking information system. And, practitioners found that the gaps explained the futility they had experience using the sites to accomplish their goal in the MMPE domain.

This research uses an iterative ADR method with action researchers and practitioners to achieve the guided emergence of Design Principles and Specific Information System Features. We formulate the learnings into a summary set of requirements for the build and evaluation of an Alpha IO SNIS Artifact. Finally, we reflect on the unique and generalizable nature of the research findings for other domains with a high social networking quotient.

From a Design Theory perspective, this research reflects upon the gap in inter-organizational SNIS research to generate a design concept (Dorst & Cross, 2001) called IO SNIS. We use inductive and abductive reasoning (Fischer et al 2012) through an iterative cycle of ADR to generate and evaluate a set of Design Principles (DP) (Markus et al 2002). These DP create new knowledge of a generalizable artifact design and begin to formulate a new design theory for a class of IO SNIS artifacts. The IO SNIS seek to solve a class of organizational problem for organizations pursing IO social behavior in digitally embedded networks (Gregor et al 2013).
CHAPTER 2: OVERVIEW

2.1 PROBLEM CLASS AND GAP ANALYSIS

This research began with an open-ended exploration of a particular class of IS artifact – Social Network Information Systems (SNIS) – that are designed to solve the class of problems best described as the need to replicate offline social behavior in an online environment.

The discussion of online Social Network Information Systems (SNIS) is a relatively recent phenomenon in academic literature. Articles on social software and internet based sites date to the mid-1990s and often explored the nature of the media and content on the sites. (Boyd & Ellison 2008) In the middle of the last decade, though, the nature of the discussion morphed from a focus purely on content sites and how content sites are organized on the internet to a much broader discussion of how humans are organized on the internet. (Mislove et al 2007) How humans are organized in social networks online is, to many researchers, much more interesting and difficult to understand than even questions of the content they are most likely to consume.

Over the last few years, web based digitally embedded social networks (Agrawal et al 2008) or social network information systems (SNIS) have emerged through the re-creation and replication of offline inter-personal (IP) social networks (SN) in this online internet. SNIS have grown rapidly since the mid-1990s with more than thirty-six internet based SNIS created since 1990 and typified by several of the more popular IP SNIS such as MySpace, Friendster, Facebook, and LinkedIn (Boyd 2008). More recently, organizations are experimenting with intra-organizational
instantiations of inter-personal social networks in a professional work related environment typified by SNIS such as Watercooler and Yammer (Brzozowski 2009).

The academic literature concerning how humans are organized in social networks offline is relatively robust with origins in psychology, sociology, and anthropology in the 1950s. Academic study of human social networks since then exists in disciplines as varied as sociology, physics, biology, psychology, anthropology, communications, computer science, management, business, and public administration. Network studies exist in nearly every industry including - but by no means limited to - agriculture, healthcare, automotive, electronics, technology, finance, and banking.

The goal of this research dictated the initial literature review focus on all reference material containing key words including: social networks, social media, social network systems, social networking systems, online social network, online social networking, and online network. To gain the broadest access to articles of academic interest, all searches were performed online through the USF Libraries access of articles facilitated by Google Scholar. Each search was limited to articles excluding patents since 1990 for all academic journals. Generally, the search for each term above conducted in this manner yielded abstracts for 30,000 to 50,000 articles. Frequently, within the first twenty abstracts the relative value of the articles to the specific topics of interest to this research dissipated. In several cases, the articles with the most bearing on the topics herein included references to foundational or seminal works by authors who led research into modern network analysis, social media, online behaviors, and social networks. In addition, the author polled recent contributions referring to the more popular online social software systems in The McKinsey Quarterly, Forrester Consulting, The Wall Street Journal, Fortune,
Business Week, and Wired to identify current studies and practical examples of the systems referenced by academic articles.

Approximately, 160 academic abstracts were reviewed by the author in this fashion. A large subset of these abstracts were found to reference digital networks and software systems that have been created to support business to business (B2B) information systems requirements.

Fundamentally, these B2B systems focus on the supply chain (SC) domain and are typified by studies of electronic data interchange (EDI), vendor managed inventory (VMI), and customer relationship management (CRM). Similarly, a large number of studies exist, principally in the marketing discipline, that discuss the business to consumer (B2C) use of social networks (offline and online) for the purpose of marketing, advertising and selling B2C (11). The B2B and B2C domains in practice and literature tend to represent a very narrowly targeted “manipulation” of a network to achieve a very specific transactional goal typified by a product or service purchase.

The principles of networks, generally, and Social Networking Systems online, specifically, provide a broad umbrella within which B2B and B2C transactional activities occur and are discussed in the section on IO SN later in this dissertation. For the purpose of this literature study, we focused on abstracts that studied the social nature of relationships - the fundamental social exchanges, connectivity, and scale-free environments that form the foundation for human networks.

From 160 abstracts, the literature review analyzed 48 peer reviewed articles published in journals or proceedings related to SNIS and the literature review selected 35 seminal works on Social Networks, Social Network Theory (offline), Inter-organizational Networks (generally) and IO Social Networks (specifically) that are useful to an understanding of the online replication of offline social network behavior. (Appendix 6 – Literature Review)
2.2 A TYPOLOGY (MULLARKEY 2012)

An approach to categorization of the SNS literature thus studied was not immediately evident given the broad nature of the survey and the lack of a framework in current SNS research. A system design approach inevitably starts with the user, especially in complex systems like human social networks that are at times “self-organizing” and environments where “behaviors” cannot always be predicted (Ababattista et al 2009, Hevner et al 2004). Understanding user needs and requirements drives information system design and the likelihood of user acceptance and adoption. The nature of the user, then, is fundamental to the nature of the system and existing research argues that SNS are no different (Dron 2007).

Social Network Theory on the other hand (discussed in detail in SNT section) specifies two main types of actors – individuals and organizations – that are typically analyzed at the actor-ego (inter-actor) or collective (whole network) level of analysis.

Consequently, this research study suggests that current Social Networking Systems literature can be divided on the vertical axis in the typology by the nature of the anticipated users in the network into two macro user categories:

1. SNIS with Individuals as the Users – IP SNIS
2. SNIS with Organizations as the Users – IO SNIS

Additionally, within the literature describing online instantiations of SNIS the author observed a difference in inferences made when individuals were acting as users in a personal capacity (Facebook) versus behavior of a professional nature (LinkedIn).
On the horizontal axis, the typology builds on network theory advanced by Borgatti et al (2011), Barabasi (2009), and Walker et al (1997) where actors are linked to other actors to form a collective network. In their social network analysis, the motivation at the actor level - for participation in and exploitation of strong and weak ties to other actors for example – is related to but independent of the questions of the network as a whole and its collective strength, behavioral norms, and social capital. Consequently, the SNIS Typology horizontal axis delineates between the actor and the collective levels of analysis.

Thus, the social network articles were coded first based on their study of networks offline or online, then their discussion of individuals or organizations, and finally their level of analysis – actors or collectives. Where articles contributed to more than one aspect of social networks, for example exploration of individuals as actors and collectives online, the article was counted in both categories. As such, 95 subtopic category references resulted from the 60 articles. Taking this approach, the author identified a categorical Typology of Social Networking Systems, not previously discussed in proceedings or articles on SNIS (Table 1), that proved helpful in examining the strength and gaps in current social networking research.

Meanwhile, all meaningful articles found with online social network references were chosen for inclusion. As previously stated above and in Mullarkey (2012), the typology highlights the existing gap in literature surrounding prospective and post hoc discussions of online instantiations of inter-organizational social networks.
Several observations from the typology table standout and bear further discussions. The vast majority of the articles available in literature focus, in whole or in part, on the nature of social networks with individuals as users for personal use (63%). Professional networks of individuals are less frequently studied (22%) and Organizational network references are weaker still (15%). This weakness in research of organizational social networks supports the conclusion of Provan et al (2007) who identified organizational networks, especially at the collective level, as “woefully understudied”. Most importantly, in the entire literature survey no research was identified that explores SNIS with Organizations as Users.

In addition to this evident gap in the literature, the typology suggests that future research will benefit from articles that specify their area of focus from the framework of the SNIS Typology. For example, since current SNIS literature does not always make a distinction on the level of analysis, leading studies by Joinson et al (2008)), Ellison et al (2009), Ellison et al (2006), Stafford et al (2004), Skeels et al (2009) and others with survey data collected from individuals.
discuss conclusions about both individuals as actors and individuals as a collective interchangeably.

The Typology of SNIS also distinguishes between the body of research where individuals as users participate in SNIS in a professional capacity as separate and distinct from individuals using SNIS for personal purposes at work. References in literature exist for individuals using social networking online to connect to other individuals for personal or professional use (Dwyer et al 2008, Gilbert et al 2008, Kemp et al 2003, Lampe et al 2008, Perotti & Hair 2011, Raacke et al 2008, Stengel 2010). References also exist for employers working to enable intra-organization social networking - for knowledge management or production innovation for example (Brzozowski 2009, Brzozowski et al 2009, Kimura et al 2007, LeRouge et al 2004). Research exists on organizations acting to block personal use of social networking on the job – often for productivity or information security concerns (Acquisti et al 2006, Dwyer et al 2007, Forester Consulting 2010, Young et al 2009). In this relatively new research field of SNIS online, editors and authors can be served by applying the discipline of the SNIS Typology to distinguish the nature of the SNIS under study.

And, while the literature survey produced a number of seminal references on organizations as actors and collectives in offline social networks, the typology indicates a surprising absence of current SNIS literature discussing Organizations as Users of SNIS online. Social networks involving organizations interacting with organizations for social network purposes and not the narrower transactional purposes of SC or CRM could not be found in this review. And whereas SNIS with IAU- Personal (Facebook, MySpace, etc.) and IAU- Professional (LinkedIn, Watercooler (see Brzozowski 2009 for a discussion of this intra-organizational effort at SNIS),
etc.) exist, no SNIS with Organizations As the Users – actors or collectives - online are known to exist at this time.

2.3 EMERGENT IO SNIS – WHY?

So, academic literature clearly shows a dearth of research on Organizations as Users of Social Networking Systems online. But, numerous studies of organizations in social networks offline exist in the literature. Organizations as Users of social networks exist offline in many forms including: consortia, geographic clusters, trade exchanges, electronic data exchanges, and business chambers of commerce (Hakansson et al 2001).

Several arguments exist to suggest that IO SNIS will exist. First, IP SNIS developed to replicate online the social networks of individual’s offline. If the development of SNIS with IP is founded in the re-creation online of the social behavior of actor(s) offline – why shouldn’t the development of online Social Networking Systems with Organizations as Users follow suit and re-create offline IO social networks online?

Second, the number of potential organizations as users and their economic impact is not insignificant. As Facebook and other IP SNIS amass and attempt to monetize more than 1 billion IAUs sometime in 2012 – roughly one in two individual internet users globally – where will the next “goldmine” of users come from?

The US Census Bureau recognizes 27 million firms with 121 million paid employees and $30.7 trillion in sales (2008). Worldwide well over 100 million firms conduct business and an equal number of governmental and non-governmental organizations operate annually. The 200+ million IO represent a very large, very valuable, untapped source of social network activity online.
Third, social networks with IO are good for organizations. Walker et al (1997) provide an insight into the benefit of inter-organizational social networks. Theirs and other research finds that social networks of organizations “mine” social capital from the IO network formation. They measured structural equivalence (firm has relationships with the same other firms in the network) among startup and partner biotech firms to determine how and why IO network formation occurs. They suggest that the formation of any organization to organization social network is a function of the interplay between the desire of actors (entrepreneurial companies in their example) to cooperate with (per Bourdieu & Coleman) or exploit holes between (per Burt) members of the existing network (Wilkinson et al 2000). That is, organizations naturally form social networks of similarly focused organizations to cooperate for a common good – creation of industry standards, co-investment, risk mitigation, and regulatory influence, for example (Wilkinson et al 2000).

These researchers argue that a very dense network of completely connected firms – each with every other – creates high social capital based on equal access to established norms of behavior and inter-firm information flows and deviant behavior sanctioning.

And high social capital equates to the strength of individual organizations and network collectives. The organizations in the social network benefit because as predictability of behavior increases self-seeking opportunism is constrained. Also, there tend to be organizations that are more and less connected and firms with more connectivity tend be less vulnerable to opportunistic behavior. Meanwhile, more entrepreneurial organizations in closed networks can take advantage of “the relatively sparse gaps” in the network structure to create an opportunity for new products or services (Walker et al 1997).
Fourth, Borgatti et al (2011) suggests that social networks are either designed to favor Choice (behaviors, attitudes, beliefs) or Success (performance based rewards). To a large extent, the IP SNIS for personal use discussed in literature exhibit traits of networks that favor Choice (users seem to favor the intrinsic benefit of connecting with like-minded peers). IP SNIS for professional use are argued to favor Success (promotion and/or impressing a supervisor seem to be important motivators to participation). And, one might predict that IO SNIS will occur as a function of Choice – for example, information on deal flow among private equity firms - and/or Success – for example cooperative clinical trials and/or drug extensions among pharmaceutical companies.

Fifth, the online environment offers organizations the power-law, small-world, scale-free properties discussed by Watts (1999) and Watts et al (1998) and evidenced in Mislove et al (2007) studies of the structure of SNIS. It should be less expensive, more rapid, and more inclusive to connect to other organizations online. Offline many existing IO social networks show a strong bias toward geographical orientation of nodes and information exchange. Nazir et al (2008) however found that one advantage of moving a social network online seems to be a release from the geographical confines where communities expanded to users in “many diverse regions” where “there is a lack of relationship between the community sizes and number of contributing countries”. If this network behavior can be studied and holds true for SNIS with IO, then an additional benefit to organizations competing in the global market might be achieved by moving social networks of organizations online.

Clearly, these five reasons for the existence of IO SNIS are illustrative and not exhaustive. To date these reasons have not lead to the design and build of an IO SNIS artifact nor are they sufficient to establish a direct exaptation of IP SNIS for the IO domain. Logically there is
something different about the problem of replicating offline IO social behavior in the digital environment that represents a different problem for this class of information system. Notably, research on IP SNIS is being conducted only after practical examples of the artifact came into existence. Prior to their existence, IS researchers were not hypothesizing about the problem – replication of inter-personal social behavior online – or the innovative artifact class – SNIS. With IO SNIS, researchers have an opportunity to get out in front of practice and consider the reality before it happens. With that in mind, we hypothesize about the way in which IO SNIS – SNIS with Organizations as Users - might be designed, built, implemented and evaluated.

2.4 CONCEPTUAL FOUNDATIONS

If IO SN act like IP SN they will (eventually) replicate online their offline social behavior. The online behavior will not replace the offline social network. Instead it will compliment offline social networks by replicating key features of social behavior that make social networks successful AND by augmenting social behavior with digital capabilities that accelerate and augment the growth, interactions and social capital inherent in social networks. In information systems research, creating the artificial – an IT solution to a problem – is the domain of Design Science Research (DSR) and operates in two domains (abstract and instance) and two main constructs (problems and solutions). (Lee et al 2011)

Walls et al (1992) found that design theory has a design product (the artifact) and a design method (means to create an innovative artifact). Good design theory is grounded in the relevance of a class of real problems facing practitioners (business need) and the rigor of a methodical exploration and adaptation of existing knowledge (applicable knowledge). (Hevner and Gregor, 2004) The result is new knowledge in the form of an innovative artifact and a means to generalize the artifact across a problem set.
IO SNIS at the initial stage of this research was an abstract solution to an equally abstract problem (or set of problems) facing organizations that do or will need to replicate offline social behavior in the online environment. The literature review identified research on a number of instantiations of the IP SNIS and key features of these digitally embedded social networks (see IP SNIS section) but no underlying design theory to use in a process to create an IO SNIS. Additionally, the literature review clearly identified a body of knowledge surrounding social behavior of individuals and organizations with Social Network Theory explaining the essential and beneficial nature of social interaction in networks on both, individuals and organizations. Goldkuhl (2004) argued that DSR generally and theorizing in DSR should be grounded in multiple sources of knowledge including external theories (including those from behavioral domains like SNT), empirical data (including the study of existing artifacts like IP SNIS), and the design theory (method to produce the innovative artifact and the artifact itself).

This study proposes that to understand this gap in literature and practice surrounding IO SNIS (and thereby create design knowledge that informs an artifact) requires an understanding of the similarities and key differences between IO and IP social networks (from SNT) as well as an understanding of the similarities and key differences between IP offline and IP SNIS. The early stage “key design concept” (Gregor et al 2013, p 4) for this research is shown in Figure 1 which provides a Research Model for exploring IO SNIS from the perspective of this typology.
The IO SNIS Research Model suggests that new knowledge about the design principles (design theory for Markus et al 2002) for this class of artifact can arise from “design theorizing through inductive processes of abstraction and reflection” on these differences (offline to online, IP to IO). (Gregor et al 2013, p 2) If we can close the “gaps” identified with knowledge of the key differences we can induce the general design principles essential to the creation of an IO SNIS artifact. If we can generate the design principles then we can evaluate those principles for a specific problem domain to elaborate specific design features. And, with specific design features we can inform the build of an IO SNIS artifact that can be prototyped as a solution for this problem set.

The rest of this research moves from the general investigation of differences to the development of design principles for the innovative IO SNIS artifact. These design principles are then evaluated through ADR to elaborate specific design features for a specific IO SN problem facing
Mid-Market Private Equity (MMPE). Knowledge of the specific problem and solution is then used to understand the generalizability of design features across MMPE and the generalizability of design principles to other IO digitally embedded social network domains as well as the limitations of the design method used and products designed.

First we start with an understanding of social networks, social network theory, and inherent differences between inter-personal and inter-organizational social networks. Through inductive and abductive reasoning (Fischer et al 2012) the research suggests a small set of design principles (design knowledge) critical to a successful IO SNIS. A study of IP SNIS follows that leads to an analysis of these online instantiations of IP social networks and, especially, the design elements that they use to augment SN behaviors. Through inductive discovery the research suggests a few fundamental design principles important to all successful SNIS. Throughout, we seek to express the “creative causal” reasoning underlying our specific design decisions as described by Gregor et al 2013 (p 9) so that we not only design an innovative artifact but also abstract and reflect to a more formal design theory of IO SNIS.

2.5 SOCIAL NETWORKS

In their review of empirical literature on whole networks, Provan et al (2007) found that most scholars studying the topic would agree that no single grand theory of networks exists (cf. Faulkner & de Rond, 2000; Galaskiewicz, 2007; Kilduff & Tsai, 2003; Monge & Contractor, 2003). Nonetheless, across the body of network literature a number of key definitions, concepts, and constructs have emerged to characterize networks based upon nodes, links, and their relationships. Many types of inter-personal and inter-organizational networks have been shown to exist. Social networks are particularly interesting to IS researchers evaluating digitally
embedded social networks like SNIS. As Parkhe, Wasserman & Ralston (2006) declare: “being social animals, humans network.”

In Social Network Theory, actors in a social network are connected and interact to generate social capital where social capital is a measure of an actor’s relative position in the network. In a sharp contrast to many other theories of human and organizational behavior, however, social network theory is much less concerned with the information about (characteristics of) the social actors and much more concerned with the social structures (connectivity and interactions) within which these actors are located. Wellman (1988) described the paradigm of social network theory as: “Structured social relationships are a more powerful source of sociological explanation than person (actor) attributes of system members” (p. 31, parenthetical emphasis added).

The power of social network theory (SNT) stems from its difference from traditional sociological studies, which assume that it is the attributes of individual actors -- whether they are friendly or unfriendly, strong or weak, etc. -- that matter. Social network theory produces an alternate view, where the attributes of individuals are less important than their relationships and ties with other actors within the network. This approach has turned out to be useful for explaining many real-world phenomena and developing an understanding of Network Science. (Easley and Kleinberg 2010).

To the extent that this assumption of Social Network Theory is true and/or useful in explaining the behaviors of actors and the benefits that accrue to one or more actors in an environment, this research asserts that it becomes important to the IS researcher to encourage a focus away from how a particular information systems enhances the characteristics of any individual actor and toward an understanding of the ability of an information system to enhance the social structures...
within that environment. The principle advantage of SNT to IS research into SNIS is that it affords a very different paradigm from the historical agency found in much of our literature.

Precisely because many different types of relations, singular or in combination, form these network configurations, network analytics are useful to a broad range of inter-personal interactions. Social networks have also been used to examine how organizations 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. These networks provide ways for organizations to gather information, deter competition, partner, and even collude. (Newell 2000)

A social network is a theoretical construct useful in the social sciences to study relationships between individuals, groups, organizations, or even entire societies. The term is used to describe a social structure determined by such interactions. The ties through which any given social unit connects represent the convergence of the various social contacts of that unit. This theoretical approach is, necessarily, relational. Wasserman (1999) describes the structure of social networks through a mapping of individuals as related to other individuals by their links where the most central nodes with the highest social power are those individuals that are mostly frequently linked or connected to others.

Social network theory views 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. The network can also be used to determine
the social capital of individual actors. These concepts are often displayed in a social network diagram, where nodes are the points and ties are the lines.

Social networks are the representation of the interactions and connectivity between actors. Actors can be individuals or organizations represented by key individuals as proxies for the organization and are often referred to as nodes. Brass et al. (2004) summarized the prior work to define a network as “a set of nodes and the set of ties representing some relationship, or lack of relationship, between the nodes.” The interactions between these actors are referred to as links where the links are binary (connected “dyadic” or not connected), directional (directed “arcs” or undirected “edges”), and “magnitudinal” (measured in terms of velocity, volume, and/or quality of interaction). The resulting social structures are the purpose of social networks and the focus of social network analysis. Social Network (SN) analysis is performed at the actor (ego), dyad (between actor), and/or whole network levels. The smallest unit of analysis in a social network is an individual or organization in its social setting, i.e., an "actor" or "ego".

The purpose of this study is to understand the fundamental principles and concepts of SNT to position this research and SNIS in the context of social networks. Consequently, the goal in this narrative is to summarize these principles and concepts for the IS researcher and practitioner for consideration in the IO SNIS Research Model and the development of non-obvious hypotheses. For that purpose, and without claiming an exhaustive consideration of SNT constructs, Table 2 summarizes the key propositions of SNT applicable for social networks of individuals and organizations from offline SNT research.
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<tr>
<th>Proposition</th>
<th>Description</th>
<th>Reference</th>
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<tr>
<td>Fundamental Axiom</td>
<td>Behavior and performance of actors (individuals or organizations) has less to do with the individual factors pertaining to the actor’s characteristics than with the position of the actor in their social network</td>
<td>Wellman, 1988</td>
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<td>Webs of Actors</td>
<td>All actors are embedded in “thick webs” of social relations and interactions</td>
<td>Wasserman &amp; Faust, 1994</td>
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<td>Centrality of Actors</td>
<td>The more central (the more 1st degree ties) an actor has the more social power he possesses and the more influence he exerts on the network</td>
<td>Wasserman &amp; Faust, 1994</td>
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<tr>
<td>Network Density</td>
<td>Network density increases as each actor becomes connected to every other actor in the network</td>
<td>Wasserman &amp; Faust, 1994</td>
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<td>Strong Ties</td>
<td>Strong ties are reflected by frequent information flows (communication) of highly valued content (as determined by the actors). Gilbert offers the definition of tie strength as a measure of “differential closeness”.</td>
<td>Wasserman &amp; Faust, 1994</td>
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<td>Gilbert, 2012</td>
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<tr>
<td>Closed Networks</td>
<td>Closed networks are represented by actors with ties only to other members of the network. Closed networks can lead to high levels of security of information flow and interaction but can also be characterized by isolation from new and different information.</td>
<td>Borgatti, 2011</td>
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<td>Weak Ties</td>
<td>Weak ties result when one actor in a network occupies a node on the fringe (generally) of the network and is (generally) a single (weak) point of contact to an entirely different network. Greater (stronger) numbers and quality of these weak ties to different network tends to result in greater avenues for the introduction of new, different information to the network. This information may take the form of innovation or infection that effect the performance of the network.</td>
<td>Granovetter, 1973</td>
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<td>Structural Holes</td>
<td>Structural holes in a network result when an actor’s first degree ties are not connected to each other. Structural holes limit the flow of communication in the network. Closing structural holes tends to increase the flow of communication and strengthen the network.</td>
<td>Burt &amp; Ronald, 1992</td>
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<td>Small World Properties</td>
<td>Small world properties exist in social networks because of inequalities in the number of ties between actors. A small number of actors tend to possess a very large number of links and act as hubs.</td>
<td>Watts, 1998</td>
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<td>Social Capital</td>
<td>Social capital tends to form as a function of an actor’s centrality, position as a hub with many ties, frequency of information flows, and ability to broker through weak ties to other networks of interest.</td>
<td>Coleman, 1988, Bourdieu, 1986</td>
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<td>Clusters</td>
<td>Sub-networks or clusters of actors tend to form to trusted partners based upon geographical, historical, and/or temporal proximity. These clusters tend to represent powerful sub-networks within a given social network.</td>
<td>Wasserman &amp; Faust, 1994</td>
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<td>Scale-Free</td>
<td>A scale-free ideal network would have random connectivity with balanced averaging of ties among nodes. But, Human social networks are found to be non-random. Ties among nodes are unevenly and non-randomly distributed resulting in hubs with higher than average connections where the network as a whole has a degree distribution that follows a power law.</td>
<td>Barabasi, 2009</td>
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</table>

In summary, social networks are defined by the connections between individuals and usually measured either in terms of structure of those connections or flows and interactions between those connections. SNT provides a foundation for understanding social networks of actors.
offline and for comparison with SNIS online. SNT offers the IS researcher an existing body of knowledge on social behavior that can and should be used to provide theoretical grounding as described by Goldkuhl (2004) for SNIS research. SNT also provides a foundation for understanding the extension of the theory from individuals acting on their own behalf, for their own organizing purpose, to those individuals acting on behalf of their organizations for an organizational purpose.

Our IO SNIS research focus asks the question, “How do IP and IO Social Networks differ?” and “Can these differences inform the IO SNIS design if we are to exapt from IP SNIS to a useful IO SNIS artifact?”

2.6 INTER-ORGANIZATIONAL SOCIAL NETWORKS (IO SN)

Over the last thirty years in concert with the rise of truly the truly global economy there has been “remarkable growth in various forms of co-operation among organizations”. (Ebers 1997) Researchers and practitioners alike have observed every industry including automotive, biotechnology, healthcare, electronics, computer, and non-profit significantly increase inter-organizational forms of cooperation. (Gerlach 1992, Haagedorn 1995, Powell 1996, Ebers 1997)

Work lead by Grandori and Soda (1995, 1997) and Newell (2000) describes inter-organizational social networking characterized by long-term, non-contractual cooperative organizational behavior. Over the same period and more recently, researchers have discussed the nature of the networks of organizations using many of the same network analysis measures and constructs adapted from inter-personal social networking analysis and theories of social networks (Granovetter, Burt, Borgatti, Barabasi) and begun applying them to inter-organizational network analysis (Zaheer et al 2010).
For an IS researcher, this broad understanding of IO networks can be problematic in that it fails to differentiate between the well-known and well researched instantiations of inter-organizational information systems and the more recent SNIS information systems. The better known and much more thoroughly researched IO instantiations include those that have been designed to enable various business to business (B2B) customer-supplier interactions such as electronic data interchange (EDI), customer relationship management (CRM), and inter-enterprise resource planning (ERP) systems and those designed to enable various business to consumer (B2C) customer-supplier interactions such as online auctions, e-commerce, and digital exchanges. These are all IO networks but they do not meet the definition of IO Social Networks (IO SN).

IO SNT research indicates that leaders in many organizations are motivated to develop and grow inter-organizational social networks of trusted partners. Organizational motivations for IO SN include: (1) the joint exploration of innovation in products and services; (2) cooperation to share resources in ways that increase revenues, lower costs, and mitigate risks; and, (3) the efficient coordination of economic activities. (Casson and Cox 1997, Granori and Soda 1995, Aldrich 1990) The IO SN organizing purpose is fundamentally different from the organizing purposes of other types of IO networks. The Organizing Purpose in IO social networks is characterized by long-term, non-contractual cooperative behavior with the fewest “coordination” mechanisms, without formal agreements, with norms and behaviors, tending to parity, symmetry, and reciprocity (Newell 2000) between representative individuals acting as organizational proxies based upon mutual obligation, loyalty, and resilient trust (Ring 1996). Importantly, these IO SN are markedly different from and frequently more effective than the low trust environments typified by short-term, transactional markets (ex: auctions) or by long-term, contractual inter-firm environments (ex: supply chains). (Casson and Cox 1997)
In Table 3, the spectrum of IO Networks from the perspective of IO SNT is compared and contrasted. The categories are adapted primarily from research by Thorelli 1986 and Ebers 2007. The spectrum provides a means of differentiating IO Social Networks from IO Markets and IO Firm based networks. Of principal interest to the IS researcher and practitioner, inter-organizational information systems clearly exist in practice for the Market and Firm ends of the spectrum where they generate billions of dollars in economic activity and in information systems expenditures annually. The focus of this research is clearly on the middle category in the spectrum of IO Social Networks and their opportunity for IO SNIS.

**Table 3: Positioning Inter-Organizational Networks**

<table>
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<tr>
<th>Spectrum of Inter-Organizational Networks</th>
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<tbody>
<tr>
<td>Market</td>
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<tr>
<td>Short-Term, Transactional, Non-Contractual</td>
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<td>IS Examples: Electronic Stock Exchanges, Digital Auctions</td>
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<td>Focus of IO SNIS Research</td>
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<td>Social</td>
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<tr>
<td>Long-term, Non-Contractual, Cooperative</td>
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<td>IS Examples: IO SNIS</td>
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<tr>
<td>Firm</td>
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<td>Long-Term, Contractual, Hierarchical</td>
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<td>IS Example: SCM, ERP, VMI, EDI SalesForce (CRM), Oracle (ERP), SAP (SCM), Maker’s Row (B2B)</td>
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Table 3, in and of itself, provides IS researchers an entire stream of research that has gone largely unnoticed. Significant IS research and artifacts exist in the Firm and Market streams of inter-organizational research. The IO Social stream of inter-organizational behavior is a novel and largely unexplored opportunity for IS researchers that can and should be considered by IS researchers from every research approach in the discipline.
And, even when researchers have looked at streams of research in the social networking class of problems, the focus tends to the inter-personal class of problems. Agrawal et al (2009), for example, provide a framework on the streams of research suggested for the IS researcher interested in the online replication of offline social behavior through digitally embedded social networks. After this researcher’s exploratory investigations of the typology and the spectrum of IO networks (presented above), Agrawal et al’s (2009) work can be expanded in two dimensions as shown in Table 4. The first is to expand the references available to the IS researcher in each of the streams. The second dimension is the addition of a fifth stream of research focused specifically on the inter-organizational social network paradigm and class of problem in the digitally embedded social network domain.

IO SNT, therefore, defines the motivation for organizations to act in collaborative ways over social networks of individuals acting as proxies for the organization. Since the gap analysis identified that unlike IP SN, IO SN have yet to replicate their offline social network behavior in an online SNIS, this research finds that organizations are motivated to pursue IO social networks but it remains a “mystery” (Martin 2009) as to why no information systems exist to replicate this offline social competitive advantage in the online environment. Logically this paper’s design thinking research asks, “If we understand how IO SN differ significantly from IP SN, can we advance from mystery to design heuristics?” (see Lee et al 2012, p 4121, “mystery to heuristics to algorithms”).
# Table 4: Streams of IS Research into Digitally Embedded Social Networks

Social Networking Information Systems (aka: digitally enabled social networks, online social networking)


<table>
<thead>
<tr>
<th>IS Research Stream</th>
<th>Description</th>
<th>Example</th>
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<tbody>
<tr>
<td>1. Exploratory and Descriptive</td>
<td>Document, describe, and make sense of the phenomena. Focus: descriptive and explanatory of how the domain (SNIS) is structured and how it operates. Questions how actors join, contribute, socialize, and depart from SNIS and why.</td>
<td>Identification of online “scale-free” and “power law distributions” characteristics in online networks.</td>
<td>Backstrom &amp; Albert (1999)</td>
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<td>Boyd &amp; Ellison (2008)</td>
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<td>McLaughlin &amp; Lee (2007)</td>
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<td>2. Online vs. Offline Parallel</td>
<td>Identify the parallel between online social networks and their instantiations online. Focus: identify the ways in which they are fundamentally similar phenomena. And, identify the ways in which they are fundamentally different due to the IS Instantiation.</td>
<td>Parallel between online and offline social network phenomena.</td>
<td>Banks et al (2008)</td>
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<td>Borgatti et al (2009)</td>
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<td>3. Analytical Order of Magnitude</td>
<td>Examination of a very large (millions) number of actors over longitudinal horizons with rich interactional data NOT previously possible. Focus: Unique opportunities to answer classic questions in human social behavior and to more fully understand group and organizational processes.</td>
<td>Analysis of tens of actors in a network to an analysis of millions of actors and their interactions over time.</td>
<td>Backstrom et al (2006) versus Coleman et al (1957)</td>
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<td>Ahn et al (2007)</td>
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<td>Nazer et al (2008)</td>
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<td>Mihoko et al (2007)</td>
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<td>4. SNIS Design Decisions and Trade-offs</td>
<td>Identification of sociotechnical design inherent in or available to SNIS that help social networks to better achieve their purpose. Focus: Consequences of design decisions and trade-offs post hoc AND prospectively in sufficient detail to guide the designs and understand trade-offs with highly multivariable design spaces. Examination of the “unexpected effects” of the online capabilities of SNIS on the social network.</td>
<td>Numerous studies of important features that promote social capital including: - Systematic feedback to increase motivation and quality of help - Identity communication with greater fidelity Unexpected effect of attempting to limit/restrict social network membership may make it more difficult to find a compatible partner.</td>
<td>Moon &amp; Sproull (2008)</td>
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<td>Ren et al (2007)</td>
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<td>Perotti &amp; Han (2011)</td>
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<td>Dron (2007)</td>
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<td>Dwyer &amp; Hiille (2008)</td>
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<td>5. Inter-Organizational Change due to SNIS</td>
<td>Analysis of the spread of SNIS on the social dynamics WITHIN the large organization. Focus: How the spread of SNIS may change the corporation, the multinational enterprise, and the organizational design of that enterprise.</td>
<td>Shift from central control at a corporate headquarters to distributed independent, empowered, specialized nodes highly connected through SNIS Promote important organizational competencies: - Knowledge management and sharing - Collaboration - Innovation and ideation</td>
<td>Elliffs (2008)</td>
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<td>Wu et al (2010)</td>
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<td>Szersz &amp; Gruen (2009)</td>
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<td>Brzoñowski et al (2009)</td>
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<td>Forrester (2010)</td>
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<td>6. <em><strong>Addition Proposed by Current Research</strong></em></td>
<td>Analysis of the opportunity for and conditions that might promote the design, development, implementation, and adoption (or rejection) of SNIS and, PROSPECTIVELY, how their spread might affect the social dynamics BETWEEN organizations.</td>
<td>Socially Immature Organizations: A typology of social networking systems with organization as users. Research Gap: Understand the needs of, and design decisions and trade-offs for Inter-Organizational SNIS.</td>
<td>Mullarkey (2012)</td>
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<td>Walker et al (1997)</td>
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No specific reference exists to identify the key differences between social networks at the inter-personal and inter-organizational levels of analysis. Clearly there exist similarities and differences between individual and organizational behavior and logically networks of individuals and organizations exist, interact and grow in similar and different ways.

Brass et al (2004) provide one of the most comprehensive literature reviews of SN research and present a resultant comparison of network behaviors at the three levels of analysis – inter-personal, inter-unit (intra-organizational), and inter-organizational. Their extensive literature review found six “antecedents” and four “consequences” of inter-organizational networks when compared to the other two IP network types. Table 5 provides a very high level summary of Brass et al’s (2004) evaluation of social network literature on inter-actor social networks.

Table 5: Perspectives Across Multiple Levels of Inter-Actor Networks (Brass et al 2004)

<table>
<thead>
<tr>
<th>Inter-Personal</th>
<th>Inter-Unit (Intra-Organizational)</th>
<th>Inter-Organizational</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antecedents:</td>
<td>Antecedents:</td>
<td>Antecedents:</td>
</tr>
<tr>
<td>Actor Similarity</td>
<td>Actor Similarity</td>
<td>Actor Similarity</td>
</tr>
<tr>
<td>Personality</td>
<td>Personality</td>
<td>Personality</td>
</tr>
<tr>
<td>Proximity</td>
<td>Proximity</td>
<td>Proximity</td>
</tr>
<tr>
<td>Environmental Factors</td>
<td>Environmental Factors</td>
<td>Environmental Factors</td>
</tr>
<tr>
<td></td>
<td>Inter-Personal Ties</td>
<td>Inter-Personal Ties</td>
</tr>
<tr>
<td></td>
<td>Functional Ties</td>
<td>Functional Ties</td>
</tr>
<tr>
<td></td>
<td>Org Processes</td>
<td>Org Processes</td>
</tr>
<tr>
<td></td>
<td>Org Control Mechanisms</td>
<td>Org Control Mechanisms</td>
</tr>
<tr>
<td>Consequences:</td>
<td>Consequences:</td>
<td>Consequences:</td>
</tr>
<tr>
<td>Attitude Similarity</td>
<td>Attitude Similarity</td>
<td>Attitude Similarity</td>
</tr>
<tr>
<td>Job Satisfaction</td>
<td>Job Satisfaction</td>
<td>Job Satisfaction</td>
</tr>
<tr>
<td>Power</td>
<td>Power</td>
<td>Power</td>
</tr>
<tr>
<td>Getting a Job</td>
<td>Getting a Job</td>
<td>Getting a Job</td>
</tr>
<tr>
<td>Performance</td>
<td>Performance</td>
<td>Performance</td>
</tr>
<tr>
<td>Getting Ahead</td>
<td>Getting Ahead</td>
<td>Getting Ahead</td>
</tr>
<tr>
<td>Turnover</td>
<td>Turnover</td>
<td>Turnover</td>
</tr>
<tr>
<td>Leadership</td>
<td>Leadership</td>
<td>Leadership</td>
</tr>
<tr>
<td></td>
<td>Consequences:</td>
<td>Consequences:</td>
</tr>
<tr>
<td></td>
<td>Performance</td>
<td>Performance</td>
</tr>
<tr>
<td></td>
<td>Innovation Activities</td>
<td>Innovation Activities</td>
</tr>
<tr>
<td></td>
<td>Knowledge Activities</td>
<td>Knowledge Activities</td>
</tr>
<tr>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

In their comparison, antecedents are uniquely essential to that SN type’s formation.

Consequences are the outcomes the actors in the SN are most concerned with achieving as a result of SN participation. Our challenge is to gain an indication of the key differences in SN
formation signaled by a comparison to the two IP inter-actor SN identified by researchers and summarized by Brass et al (2004).

They find that: “Many of the variables that explain the formation of inter-personal and inter-unit networks explain the creation of inter-organizational networks as well.” (p 802) Their research finds that these networks possess three common sets of consequences:

1. They transfer information that gives rise to attitude similarity, imitation, and the generation of innovations;
2. They mediate transactions among organizations and cooperation among individuals; and
3. They give differential access to resources and power.

However, their literature review also finds that the formation of IO SN require several unique antecedents: Motives, Learning, Trust, Norms & Monitoring, Equity, and Context (Table 5). A comparison of these antecedents to works by researchers in the IO SN domain offers a means to hypothesize the key differences between IO SN and IP SN.

Brass et al’s “Motive” antecedent compares favorably to organization’s motivations for joining inter-actor social networks found in IO literature. Organizations are motivated to form IO SN to augment resource acquisition, mitigate uncertainty, enhance legitimacy, and/or attain a collective goal (Galaskiewicz 1985, Oliver 1990). In this dissertation we use “Organizing Purpose” to denote any organization’s “Motive” for IO SN participation as motive and motivations are commonly considered at the individual level of analysis in many disciplines. Organizations always have a specific purpose in sight when they choose to participate in inter-organizational social behavior. This purpose is critical to the survival of the organization or an organization will not waste the resources needed to form the social network.
A second critical antecedent to IO SN formation found by Brass et al is “Trust”. They cite the distinctions made by Zaheer et al (1998) between inter-personal and inter-organizational trust. Citing multiple researchers they find that inter-organizational trust, although difficult to measure, is essential to long-term cooperative behavior and that it differs from inter-personal trust formation. IO trust depends upon trust between groups of individuals at organizations and is influenced by the nature of management teams, industry segmentation, market uncertainty, and the experiences gained among individuals at leadership levels. In this sense it is a collective concept that Ring (1996) considers either “resilient” (leading to IO SN formation) or “fragile” (leading to IO SN disintegration). Brass et al (2004) do not say that trust is more or less important to organizations than it is to individuals in social networks, only that IO SN require IO trust to exist.

A third antecedent to IO SN formation according to Brass et al’s analysis is “Norms and Monitoring”. Their research finds that IO SN form only when significant reciprocity of norms and rules of behavior exist (Kogut 2000). IO SN tend to form structures (Coleman 1988) and “heuristics that actors evoke in relating to others” (p 803) (see also Larson 1992). Often these rules are influenced by third parties (think regulators and legislators as well as industry standards bearers) and actors learn about others’ deviations and impose sanctions across the network. These norms and behaviors are interesting in that they tend to occur among partners with similar status and power (“Equity”) typified by multiple authors of IO SN research (Ebers 2007). IP SN do not require these same antecedents of norms, monitoring, context and equity to form. The real network formation impact is on the information exchanged within IO SN among trusted partners who are often collaborators on the one hand and competitors on the other. The management of the risk of information sharing only within the norms, rules, and standards
chosen by member organizations is a unique antecedent to IO SN formation, growth and survival. “Exogenous influences” can create an environment where information exchange and collaborative behavior in IO SN is promoted or prohibited.

We find the antecedents “Learning” and “Context” as more boundary conditions in IO SN formation (as presented by Brass et al 2004) than as differences to IP SN formation. They present “Learning” as an antecedent in that IO SN tend to form where organizations can “learn” most from and are attractive to other organizations in the same industry much more than actors in different industries. “Context” provides a related boundary condition to IO SN formation primarily due to the fact that the industry domain is one of the strongest contexts for inter-organizational cooperative behavior in IO SN (Ebers 2007). Our research uses the boundary of an industry domain to provides a distinction between the more generalizable design principles (DP) of IO SNIS across industries and the industry domain specific IO SNIS design features (DF).

Thus, a thorough literature review of IO SNT literature provides evidence that IO SNs are fundamentally different from IP SNs in several important ways. Specifically, Organizations interact in IO SN where (1) the organizing purpose is a desired outcome, (2) inter-organizational interaction is strongly restricted by concerns for resilient trust among potential organizational partners, and (3) norms and monitoring of interactions must be mitigated by the risks associated with competitive information sharing.

For the purpose of IO SNIS research we compare and contrast these key IO SN differences to IP SNIS empirical research to fully understand the differences in the context of the artifact class and to hypothesize how these issues must be addressed in the design of an IO SNIS.
2.7 ORGANIZING PURPOSE

The first key difference between IO and IP SN is that the individuals acting as proxies in IO SN pursue an Organizing Purpose in the social network that is dictated by the motivations and desired outcomes of the organization. As the research on IP SNIS shows (discussed later in this Chapter), the organizing purpose of IO SN is very different from that observed in IP SNIS.

According to Ebers (1997), Grandori and Soda (1995) and Aldrich (1990), the organizing purpose for IO SN can be summarized as:

- exchange of “social goods” – prestige, power, and sense of belonging
- “exploration” – exchange of information to build a “trusted partner pool”
- “tightly-coupled action-oriented” – get common things done
- cooperation to “increase revenue”
- cooperation to “lower costs/risks”

By contrast, research into IP SNIS show that the most common organizing purposes for individuals are Self-Presentation, Relationship Initiation, and, Management of Ongoing Relationships (Ellison et al 2006). Joinson (2008) conducted a two stage study to generate an exploratory list of uses and gratifications that were then subjected to factor analysis that fundamentally confirms Ellison et al (2006) and offers additional detail on IP SNIS’ organizing purpose. In the factor analysis, participants were 241 Facebook users (mean age – 25.97 years; 80 male; 161 females; 62.7% full time students; 30.7% full time workers) who responded to an online request to complete online study. The most important factors for users of this typical IP SNIS were related to “social searching” and “surveillance” functions consistent with Lampe et al 2006. Each of the factors consisted of marker items scored by a loading of .5 or greater and are
detailed in Joinson (2008). Table 6 summarizes the seven factors thus defined and offers further
detail on why inter-personal users join and use a typical IP SNIS.

**Table 6: Organizing Purpose for IP SNIS (Joinson 2008)**

<table>
<thead>
<tr>
<th>Factor</th>
<th>Description</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Social Connection (keeping in touch) Finding old friends, reconnecting, contacting distance separated friends</td>
<td>.89</td>
</tr>
<tr>
<td>2</td>
<td>Shared Identities (joining groups) Organizing, joining or communicating events and groups</td>
<td>.74</td>
</tr>
<tr>
<td>3</td>
<td>Photographs (posting) Viewing, tagging, sharing</td>
<td>.89</td>
</tr>
<tr>
<td>4</td>
<td>Content (activities online) Applications, games, quizzes</td>
<td>.74</td>
</tr>
<tr>
<td>5</td>
<td>Social Investigation (check on others) People watching, type searching, meeting, stalking</td>
<td>.75</td>
</tr>
<tr>
<td>6</td>
<td>Social Surfing (viewing other’s social network) Looking at friends’ friends and non-friends profiles</td>
<td>.79</td>
</tr>
<tr>
<td>7</td>
<td>Status Updates (self-presentation) Update personal status, news feeds, viewing others status updates</td>
<td>.71</td>
</tr>
</tbody>
</table>

Perotti (2011) conducted 86 qualitative interviews on SNIS features valued by a convenience
sample of college students with experience using 14 SNIS sites. His cluster analysis identified
seven statistically significant reasons for individuals to organize in social networks on SNIS
sites: *keeping in touch, organizing personal and contact information, sharing personal
information, finding people, presenting self-image, enjoying entertainment media, and getting to
know others.*

And, Ellison et al (2006) conducted several separate surveys of university students over three
years finding that users primarily participated in the SNIS to “find, meet, check out, learn about,
and keep in touch” with other people inside and outside their immediate offline personal
network.
The principal organizing purpose in IP SNIS is “connecting” through social searching and social browsing and the principal measures of success are related to the number of ties, frequency of connection and volume of content posting (sharing). (Grossman 2011, Joinson 2008, Ellison et al 2008, Lampe et al 2006) Consequently, IP SNIS favor design elements promoting relatively unconstrained growth in connectivity as “users look at, look up and keep up” (Joinson 2008) with other individuals.

But, in IO SN specific outcomes measured against the organizing purpose are the ultimate measure of social network effectiveness. In this case, it is not the quantity of ties but how a connection to a partner increases the probability that the desired economic outcome occurs that matters to an organization. Unlike most inter-personal social networks, it is therefore possible to have design elements that lower social capital but increase desired economic outcome. For example, an organization may be less interested or un-interested in closing all structural holes and instead completely focused on establishing a high quality interaction with the organization it perceives to have the resource, innovation, or other capital essential to the organization’s success. This might be a central actor with high social capital but it might also be a peripheral actor with the desired fit to its goal. The alternative, unmodulated growth in connectivity may expend scarce resources on interactions understood to have no effect on the organizing purpose.

Consequently, rapid growth of connections inherent in several IP SNIS design features might yield “unexpected effects” in IO SNIS unless that growth can be shown to be tied to an organization’s desired organizing purpose.

*Design Construct 1a: IO and IP social network organizing purposes are measurably different.*
Design Construct 1b: An information system designed to support an IP SN, will not necessarily provide the environment for an IO SN.

2.8 RESILIENT TRUST

A second key difference between IO and IP SN stems from the IO SNT concept of Resilient Trust. Ring (1997) suggests that the formation of inter-organizational social networks rests on “resilient trust”. In his definition, resilient trust is a combination of moral integrity and goodwill displayed by organizations toward one another over a period of time. He compares resilient trust inherent in inter-organizational social interaction to the “fragile trust” inherent in market and firm interactions characterized by Ebers (1997) as possessing “low-trust mechanisms of coordinating economic activities”.

Resilient Trust has been discussed as a potential barrier and a potential facilitator of inter-organizational social networks but a few key distinctions mark its importance to organizational social networks. Specifically, inter-organizational Social Networks by definition avoid the cost of low trust mechanisms typical to the market and the firm. They therefore foster trust among member organizations in the defined social network through more open exchange of information, development of long-term interactions, leading to stronger connectivity, all without the costs associated with long-term firm-type interactions (Ebers 1997, Casson & Cox 1997, Ring 1997, Molm et al 2009). Resilient Trust equals predictability of the moral integrity and goodwill of prospective network organizations (Ring 1997) and, conversely, reliance on classical contractual agreements increases distrust and opportunism (De Laat 1997). As a boundary condition to the theory, inter-organizational networks that possess “fragile trust” are supported by contractual safeguards and generally lead to “arm’s length” short-term market interactions or expansively
designed long-term firm interactions typified by contractual agreements and bureaucratic costs of unified governance (Ebers 1997).

Without resilient trust, IO SN will not form offline. In SNT literature, IP connectivity is first and foremost a function of the growth and maintenance of social capital with significant imbalances among individuals. Individuals form connections with neighbors with varying levels of trust and intimacy (Wasserman and Faust 1994, Watts 1998). In some cases, such as the case for the strength of weak ties, trust is either assumed or ignored and SNT suggests that social networks of individuals who do not establish resilient trust can still arise.

Evidence from research into online privacy in IP SNIS indicate that users of these systems accept levels of disclosure and utilize privacy control measures in a manner inconsistent with the IO SNT concept of resilient trust. Throughout the literature surveyed, the uses and gratifications of SNIS to actors and collectives of actors at the individual or organizational level is juxtaposed with the perceived risks to privacy, system security and content ownership. Three studies in this survey facilitate one’s understanding of the actual user behavior versus user stated concerns about privacy, security and personal/professional/business information ownership.

Young et al (2009) interviewed a convenience sample of 19 university students (Canada) while the students were logged into their Facebook profile. They questioned the users’ SNIS disclosure settings, profile accuracy, and privacy practices. Their significant findings show:

1) larger social network users were more likely to reveal information,

2) concern for unwanted sharing showed no association to actual user privacy settings employed,

3) frequency of use was not shown to be associated with information revealed, and,
4) the stated concern for privacy was correlated with less information visibility and a model of the significant factors explained about 35% of the variation in privacy settings observed.

Acquisti (2006) had a much larger 294 user convenience sample (209 with FB profile, 81 with no profile, 8 with deactivated FB profile) of members of the authors’ university. Their significant findings included: non-members of the SNIS had significantly higher importance on privacy but no other statistically difference between groups found in any other category; actual SNIS membership was uncorrelated to level of privacy concern; FB profile information tended to be accurate and complete (86% provide information such as birthdate, email, phone, real name); and, users stated concern for privacy was uncorrelated to higher privacy settings in the SNIS. In fact, Acquisti found that about 1 in 4 users did not know how to adjust privacy settings and were equally unaware of the visibility of their existing profile to others in the SNIS. Dwyer et al (2007) broadened the research into privacy, trust and intimacy and found very similar results.

Thus, evidence suggests that many individuals do not act to protect confidential information – even when that information is their own – in spite of their professed commitment to guard their personal and professional information religiously. Some of this behavior is no doubt a function of the underlying purpose in a social network – sharing, collaboration and self-presentation.

Organization social network interaction is a function of resilient trust where reciprocal exchanges produced in IO SN interactions are stronger than negotiated contractual agreements. In these cases, the trust is by definition more resilient and affect based if the partners interact or non-existent if they do not pursue reciprocal exchange. (Molm et al. 2009, Ring 1996)
By comparison, IP SNIS owe much of their diffusion success to near-complete transparency. Numerous studies show IP SNIS participation correlating with near-complete transparency of actor’s networks to others in ways that promote self-presentation, looking at, looking up, and keeping up with others in and out of the actor’s 1st degree ties. There is an inherent trade-off between the quantity and quality of connections in SNIS. IP SNIS growth favors design elements that provide scale-free rapid growth in the quantity of ties and that increase the quantity of flows across those ties (shared content for example). IP SNIS design elements therefore tend to favor increases in the number of members, contribution of resources, and frequency of participation. In IO SNIS, however, uncontrolled network efficiency may create ties (connectivity) that promote low-trust interactions that will tend to lower IO SN participation. (Narayan & Cassidy, 2001)

Design Construct 2a: Organizations, by definition, interact in social networks of trusted partners where relationships are defined by resilient trust.

Design Construct 2b: Organizations will not interact in IO SNIS where connectivity to all is favored over connectivity to the few.

2.9 COMPETITIVE RISK AND INFORMATION SHARING

Unlike individuals, organizations in social networks are constrained by competitive, legal, regulatory, proprietary, and compliance strictures governing their information sharing - even among trusted partners. When competitive risks are high (i.e.: to resource imitability, sustainability, or mobility) the partner’s trustworthiness must be “near-absolute”. (Ring1996) Even when trust is absolute, organizations can not afford to have information sharing that violates the law or statutes governing regulatory or compliance activities and have established
controls in each of these areas for representatives who act as proxies for the organization in interorganizational social networks. Research of IT leaders and key managers by Forrester commissioned by Cisco (2010) identified that one of the three most important potential barriers to the online use of SNIS was “sharing too much” – typified by concerns over controls, privacy, confidentiality, legal, compliance.

Organizational participation in social networks is a delicate trade-off between the benefit of reciprocal exchange and the risk to competitive, legal, compliance, regulatory, and/or proprietary disclosures. For example, organizations often consider their 1st degree ties a competitive advantage not to be shared, so promoting transparency of actor’s networks might yield the “unexpected effect” of lowering participation in the IO SNIS. IO SNs frequently restrict the size of the community in order to insure high quality exchange of information and resource sharing while meeting appropriate governance requirements. Inefficient institutional and relational factors may also be at work restricting the number of participants in the network. In either case, restricting the sub-network size reduces the probability of finding non-incumbent partners that could prove to provide valuable reciprocal exchange.

Although this key difference has some overlap with considerations for Resilient Trust, Competitive Risk in Information Sharing over social networks stands alone as a key difference to IP SN.

*Design Construct 3: Organizations will require specific controls over interactions that restrict information volume, velocity and content in ways that IP SNIS do not.*

Table 7, The Organizing Framework for IO SNIS Trade-offs summarizes these key differences and is adapted from “Table 1: An organizing framework for Social Media Research”, Aral,
Dellarocas, and Godes, ISR 24(1), p. 5. This adaptation breaks out the key trade-offs organizations in competitive environments face when making social network behavioral choices.

Table 6 also takes the liberty of transposing the “Activities” of the Firms in the social network and places them in the first column after “Discussion”.

Table 7: Organizing Framework for IO SNIS Trade-offs

<table>
<thead>
<tr>
<th>Objective</th>
<th>Competitive Risk</th>
<th>Resilient Trust</th>
<th>Organizing Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Discussion</strong></td>
<td>Organizations invest resources productively to achieve competitive advantage that leads to sustainable protection against resource imitability, sustainability, and mobility.</td>
<td>Organizations in competitive environments where risks are high seek reciprocal (long-term, non-contractual) exchange with partners with whom they have resilient trust.</td>
<td>Growth in Social Capital is not an end in itself for organizations. Organizations engage in social networks where growth in social capital is proven to correlate to improved economic outcomes.</td>
</tr>
<tr>
<td><strong>Activity 1: Design &amp; Features</strong></td>
<td>How should firms interact with specific platform features to maximize their benefit? Which features lower the cost of creating, maintaining, and growing valuable relationships? Which features increase the benefits of the existing IO SN by moving it online? Which features provide benefits not before possible in offline IO SN? Which features lower protections against resource imitability, sustainability, or mobility? (ex: network partner connections visible to competition)</td>
<td>Which features protect reciprocal exchange? Which features increase risks of interaction with non-trustworthy neighbors? Which features increase the need for contractual, binding agreements thereby lowering the resiliency of trust?</td>
<td>Which features grow social capital in a manner that can be expected to lead to the desired economic outcome? (i.e.: Private Equity organizations know that visibility to significantly more deal opportunities in their target market will lead to more deals complete – the key economic outcome)</td>
</tr>
<tr>
<td><strong>Activity 2: Strategy &amp; Tactics</strong></td>
<td>Which SNIS activities are most likely to improve competitive advantage? Which SNIS activities need to be avoided as threats to competitive advantage or its sustainability?</td>
<td>How will network of neighbors be restricted – if at all? How will visibility of network members be maintained and/or avoided? How and when will resilient trust be inferred on a prospective partner? How and when will resilient trust be lost and relationship-tie withdrawn? Will relationships be segregated by levels of trust?</td>
<td>To what extent will network be aware of organization’s desired outcome? To what extent will partners be aware of organization’s desired outcome? How will benefit to the organization occurring as a result of a trusted interaction lead to compensation for the partner organization?</td>
</tr>
<tr>
<td><strong>Activity 3: Management &amp; Organization</strong></td>
<td>Which functional area and who will maintain and monitor IO SNIS membership? How will the performance of the membership team be measured and compensated?</td>
<td>Which functional area and who will determine which actors are worthy of resilient trust? Which functional area will establish regulatory oversight and monitoring of interactions? (i.e.: to avoid illegal or unethical disclosures) How will the SNIS itself monitor, track and report on behaviors in the SNIS?</td>
<td>How and when will the desired economic outcome goal be defined and/or modified? How will individuals representing the organization in the SNIS be selected, managed, and rewarded?</td>
</tr>
</tbody>
</table>
In summary, SNT suggests that many similarities exist between IP and IO SNs. But, a review of the Social Network literature also shows the key differences between IP and IO social networks. These key differences are understood to generate key differences in the resulting social networks in studies of offline social networks. This research hypothesizes that these differences must be accounted for in the design of an IO SNIS.

2.10 CLASS OF INNOVATIVE ARTIFACT - SNIS

Boyd and Ellison (2008) discuss Social Network Sites where the “network” is an online connection of users who are typically connected offline. Digitally embedded social networks replicate individual communication within “existing extended social networks.” Agrawal et al (2008) terms these “new social networks … constructed on digital platforms and digital technologies extending the reach and range of existing social networks”. Kleinberg (2008) states that the SNIS artifacts effect the “convergence of social and technological networks” through “online spaces to form connections with others, build virtual communities, and engage in (social) behaviors” that are both governed by longstanding principles of social network interaction and modified by the nature of the information systems and their effects on styles and types of communication possible between actors. He further observes that the convergence offers researchers an ability to study social networks through the data available at unprecedented levels of scale and resolution. Our research finds that SNIS not only replicate offline social network
behaviors, they also uniquely enhance the opportunity for social networks to form, grow, and strengthen.

Through empirical studies, Joinson et al (2008) and Perotti & Hair (2011) expand the definition of the online social network to include the process of reaching out to individuals within and beyond one’s existing extended network – a process Boyd and others refer to as “networking”. McLoughlin et al (2007), Wu et al (2010) and others also recognize that social networking engages multiple social tools online and may engage more than one “web site”. Thus, the online activities of a social networking system mirror the off-line nature of social networks and are a collection of tools, addresses, and seamless operations that – at their best - represent full-fledged ensemble artifacts like those discussed by Orlikowski and Iacono (2001).

In this research, Social Network Information Systems (SNIS) are defined as online social networks consisting of actors and their interactions using a collection of digital tools, addresses, web based software operations and internet based hardware that create structures and effect behaviors and outcomes for actors in a social network. SNIS are a class of innovative artifact that address, in whole or in part, the digitally embedded interactions of social actors where actors may be individuals or organizations.

2.11 SNIS EMERGENCE

Since 1997, roughly 43 instantiations of IP SNIS have evolved to replicate offline social network behaviors online. (See Boyd & Ellison, 2008, Figure 1: “SNS Launch Dates”) The most prolific of these instantiations, Facebook, has connected more than 750 million people in roughly seven years. Inter-personal SNIS with Individuals as Users have managed to replicate existing social networks and to facilitate new connectivity of individuals to extended networks well beyond the
geographic and clannish social network structures endemic to human history (Boyd 2008, Skeels 2009, Wu 2010).

In addition to IP instantiations of SNIS, SNIS research describes the phenomenon of Inter-Professional (IPpro) SNIS (ex. LinkedIn) where the organizing purposes are job seeking and recruiting (Skeels, 2009). And, more recently, organizations are experimenting with Intra-O rganizational instantiations of inter-personal social networks in a professional work related environment (IPorg) typified by SNIS such as Watercooler (HP), Beehive (IBM), Connections (IBM) and Yammer (Microsoft). Organization support these IPorg SNIS to increase inter-personal knowledge sharing, coordination and innovation within the organizational context (Forrester, 2010). Figure 2, “Hierachy of the Levels and Types of SNIS”, organizes the literature landscape of SNIS application domain available to the SNIS researcher.

<table>
<thead>
<tr>
<th>Social Networks</th>
<th>Online (SNIS)</th>
<th>Hybrid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organizational</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inter-Organizational (B2B)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Online</td>
<td>Facebook, LinkedIn, Beehive (IBM)</td>
<td></td>
</tr>
<tr>
<td>Intra-O rganizational (E2E)</td>
<td>Watercooler (HP), Connections (IBM)</td>
<td>Yammer (Microsoft)</td>
</tr>
<tr>
<td>Social</td>
<td>Mark*</td>
<td></td>
</tr>
<tr>
<td>Fan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Policy</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Asterisks indicate organizational interactions that are not social interactions but are used in this diagram to position the IO SNIS.

Figure 2: Hierarchy of the Levels and Types of SNIS
The SNIS research gap identified in Mullarkey (2012) in literature and practice exists at the level of the organization to organization interaction commonly studied in IO SNT and non-existent in SNIS research (gray boxes in Diagram 1). This research focuses on the prospective extension of IO SNT to anticipated instantiations of IO SNIS.

2.12 IP SNIS DESIGN ELEMENTS

Recent empirical research into IP SNIS finds that the best instantiations of this type of social network information system provide tools that allow individuals to connect virtually online in much the same way they would in offline social networks with the added benefit of much lower thresholds of cost to connect over large distances, fewer time restrictions on communicating and sharing inter-personal content, increased numbers of weak ties in sub-networks leading to the introduction of more, different innovative ideas, and greater expansion of connections (principally through inter-connectedness of first and second degree nodes) than with offline social networks. (Joinson et al 2008, Dron 2007, Ellison et al 2006, 2009) Each of these elements impacts the efficient or effective social capital growth of the actors in the social network.

As discussed, an exhaustive evaluation of all of the existing empirical research on IP SNIS was performed for this research. The 48 articles that constitute this body of research at the time of this dissertation are typified by qualitative and quantitative empirical studies of convenience samples of users of IP SNIS. The preponderance of these researchers attempted to understand questions surrounding why individuals joined SNIS, how users felt SNIS replicated offline behavior, and which features of SNIS most encouraged participation. We performed a meta-
analysis of these articles to gain a more generalized understanding of the common threads of SNIS that attract users.

In Table 8, “IP SNIS Taxonomy”, we summarize the identified socio-technological design elements in SNIS that current qualitative and quantitative research suggests have the most effect on the actors’ motivations to join and participate in SNIS. The motivations for SNIS can be summarized into three key differences between offline and online IP Social Networks and highlight the importance of the SNIS to online IP SN success. The three key differences between offline and online IP SN as identified in the literature review are 1) digital proximity, 2) recommender algorithms, and 3) efficient connectivity.

Digital proximity in SNIS eliminates the physical and temporal limitations historically present in social networks. Social networks traditionally favor close geographical proximity so that actors tend to connect to other actors that they encounter in person on a frequent basis. These ties to physical neighbors create powerful clusters where an actor’s social capital is favored by physical proximity and disfavored by geographical separation. Geographic proximity is shown to increase the quantity and quality of connections for individuals and organizations. Ellison (2009) and Nazir et al (2008) show that IP SNIS create a digital proximity that makes physical proximity less important to social network connectivity and interaction.

In social networks, actors tend to interact with neighbors in the same or similar time zone more frequently than with non-temporally proximate neighbors. This type of interaction occurs when communication is synchronous and actors historically form stronger ties when they have regular synchronous communications with others.
### Table 8: IP SNIS Taxonomy - Key Differences Between IP SN and IP SNIS

<table>
<thead>
<tr>
<th>Key IO SNIS Difference</th>
<th>Key Socio-Technical Design Element in SNIS</th>
<th>Existing, Offline IO SN are:</th>
<th>Identified IP SNIS design capability:</th>
<th>References:</th>
</tr>
</thead>
</table>
| Digital Proximity      | Geographic Proximity                      | Dependent on Geography: ties to physical neighbors create powerful clusters where an actor’s social capital is favored by physical proximity (Silicon Valley) or disfavored by distance. | Transcend Geography; ties to digital neighbors can create powerful clusters limited only by an actor’s concept of digital proximity which increase an actor’s social capital while also expanding the diameter (collective social capital) of the sub-network cluster. | Wasserman & Faust 1994 Herrigel 1995
|                        |                                           |                               |                                      | Nazir et al 2008 |
| Efficient Connectivity  | Cost/Benefit Efficient                    | Costly to Grow; existing connectivity tools have reach their cost/benefit nadir | Lower total cost of Connectivity increase number of ties and therefore the centrality of the actor and increasing frequency of interaction with neighbors. Virtually shortening longest path to second and third degree connections thereby increasing access to resources and information. | Wasserman & Faust 1994 Mislove et al 2007 |
| Recommender Algorithms | Homogenous Recommender                    | Actors frequently remain unaware of structural holes that leave the network porous lowering density and therefore the speed and completeness of information flows. | Provide recommender algorithms that make actors aware of structural holes and facilitate invitations to close holes in triadic relationships increasing interaction, density and strengthening the network. Improves Homogenous Bonding. | Burt & Ronald 1992 Joinson 2008 |
|                        | Heterogenous Recommender                  | Actors frequently remain unaware of adjacent networks available through weak ties. | Provide recommender algorithms that make actors aware of weak ties to adjacent networks thereby increasing flow of new, innovative information to the actor and within the network. Improves Heterogeneous Bridging. | Granovetter 1973 Borgatti 2011 |
| Efficient Connectivity | New Entrants                              | New entrants (“latecomers”) are frequently disadvantaged in tie formation. | Active new entrants to the network are frequently able to grow ties and social capital more rapidly than less active incumbents. | Wasserman & Faust 1994 Eisenhardt & Schoonhoven 1996
|                        |                                           |                               |                                      | Nohria & Garcia-Pont 1991
|                        |                                           |                               |                                      | Dwyer et al 2008
|                        |                                           |                               |                                      | Steinfield et al 2008 |
| Digital Proximity      | Temporal Proximity                        | Dependent on temporal proximity; actors tend to interact with neighbors in the same or similar time zone more frequently than with non-temporally proximate neighbors (ties). | Facilitates interaction with neighbors independent of temporal proximity leading to greater interaction across a wider set of neighbors yielding richer information flows. | Wasserman & Faust 1994 Saxenian 1996
|                        |                                           |                               |                                      | Perotti & Hair 2011 |
| Efficient Connectivity | Structural Analytics and Network Expansion| Social network structures become complex quickly and are extremely difficult to analyze limiting most structural and outcome analysis to individual dyadic relationships, small networks or sub-networks, and limited time horizons. | Digital data collection allows unprecedented data analytics in real-time and across longitudinal timeframes on tens of millions of nodes and a multiplicity of ties involving massive volumes of information types and frequencies in order to enable “analytically” active actors the ability to rapidly identify weaknesses and adjust its structural positioning and interactions to maximize important outcomes. | Wasserman & Faust 1994
|                        |                                           |                               |                                      | Barabasi 2009 Lewis et al 2008 |
| Efficient Connectivity | Network and Actor Visibility              | In offline social networks visibility to any given actor’s network is limited with most actors unaware of another’s 1st, 2d and 3d degree ties. Actors themselves are frequently unaware of the extent of their network and unable to exploit the fullness of their existing connections. Overall growth and strength of the social network are inhibited as a result. | 1st degree connections are made evident to each actor. Current instantiations of SNIS also make the connections of each actor available for view by other actors. The result favors increased connectivity initiated by the actors with or without additional external input. This visibility also favors increased interaction quality and quantity between actors. | Wasserman & Faust 1994 Gulati 1995
|                        |                                           |                               |                                      | Kogut 1992
|                        |                                           |                               |                                      | Young et al 2009
|                        |                                           |                               |                                      | Dwyer et al 2007
|                        |                                           |                               |                                      | Acquisti & Gross 2006 |

References: the first set of references is related to offline social networks and the second set relates to IP SNIS.
IP SNIS are shown to facilitate interaction with neighbors independent of temporal proximity leading to greater interaction across a wider set of neighbors yielding richer information flows. The communication can be synchronous and asynchronous where the key difference is that the message is transmitted in real-time and can be accessed at the leisure of the receiver. (Perotti & Hair 201) Suddenly, actors in North America and Asia can be as connected with the same quality and quantity of interaction as any two dyadic actors on the east coast of the U.S.

Digital proximity is a key motivation for actors to participate in SNIS.

*Design Construct 4: Users of IO SNIS are attracted to SNIS because of digital proximity not found in offline social networks.*

Recommender Algorithms take two principle forms in IP SNIS – homogenous and heterogeneous. Homogenous recommender algorithms encourage actors to close structural holes. Historically, actors are frequently unaware of the existence of structural holes. Unless one actor made the introduction between two of her ties, it was very unlikely the ties themselves would independently connect. The digital structure of IP SNIS make it relatively simple for the artificial intelligence of algorithms to recommend connections that close structural holes. These recommendations can be made to the “parent” node or to either of the “child” nodes that should become connected. Closing structural holes is shown to increase the connectivity in the social network, improve the interactions among ties, and strengthen the network as a whole. Joinson (2008) provides evidence that recommender algorithms that make actors aware of structural holes and facilitate invitations to close holes in triadic relationships increases interaction and density and strengthens the network, thereby improving homogenous bonding.

Heterogeneous recommender algorithms identify weak ties most opportune for connecting one network with another network across a “bridge” actor that may be only weakly connected to
either network. Connecting these weak ties is the best way to introduce new knowledge
including innovations to the network. Again, the artificial intelligence of the recommender
algorithm can use the digital network information to identify opportunities for suggesting
connection to a weak tie. Joinson (2008) provides evidence of recommender algorithms that
make actors aware of weak ties to adjacent networks thereby increasing flow of new, innovative
information to the actor and within the network thereby improving heterogeneous bridging.

*Design Construct 5: Users of IO SNIS are attracted to SNIS because of recommender
algorithms not found in offline social networks.*

The third motivation to use SNIS is to take advantage of efficient connectivity. The digital
domain provides SNIS with an advantage over offline social networks in four areas:

1. Cost/benefit
2. New entrants
3. Structural analytics
4. Network and actor visibility

Cost/Benefit: Mislove et al (2007) find that the digital domain makes the addition of each one
new connection nearly cost free. The lower total cost of connectivity increases the number of
ties and therefore the centrality of the actor. Cost free connectivity also increases the frequency
of interaction with neighbors. And, digital connectivity virtually shortens the longest path to
second and third degree connections thereby increasing access to resources and information. All
of this compares favorably to the historical cost of connectivity and the cost/benefit limits of
existing tools such as meetings, conference calls, travel, and televideo.

New Entrants: Offline, new entrants (“latecomers”) are frequently disadvantaged in tie
formation. Existing actors are already involved and consider it expensive to add one more
connection. And, new entrants have difficulty becoming aware of all the actors in the
network. Everything takes time and increases the cost and effectiveness of new entrants. Dwyer et al (2008) and Steinfeld et al (2008) find that active new entrants to the digitally embedded SNIS network are frequently able to grow ties and social capital more rapidly than less active incumbents. SNIS eliminate many of the costs of adding each additional connection, as discussed, and importantly provide significant network “visibility” that historically cost new entrants significant time and resource expenditures.

Structural Analytics: Social network structures become complex quickly and are extremely difficult to analyze in offline environments. This limits most structural and outcome analysis to individual dyadic relationships, small networks or sub-networks, and limited time horizons. Lewis et al (2008) find that digital data collection and structural analysis in SNIS, on the other hand, allows unprecedented data analytics in real-time and across longitudinal timeframes on tens of millions of nodes and a multiplicity of ties involving massive volumes of information types and frequencies. Consequently, “analytically” active actors possess the ability to rapidly identify strengths, weaknesses, risks and opportunities in the digitally embedded social network and adjust their structural positioning and interactions to maximize important outcomes.

Network and Actor Visibility: In offline social networks visibility to any given actor’s network is limited with most actors unaware of another’s 1st degree ties and almost all completely unaware of 2nd or 3rd degree ties. Moreover, actors themselves are frequently unaware of the extent of their network and unable to exploit the fullness of their existing connections. Overall growth and strength of the social network are inhibited as a result. Yound et al (2009), Dwyer et al (2007) and Acquisti & Gross (2006) find that in SNIS 1st degree connections are made evident to each actor. Current instantiations of SNIS also make the connections of each actor available for view by other actors. The result favors increased connectivity initiated by the actors with or
without additional external input. This visibility also favors increased interaction quality and quantity between actors.

*Design Construct 6*: Users of IO SNIS are attracted to SNIS because of efficient connectivity not found in offline social networks.

Current SNIS enable connectivity of individuals in a scale-free, social, online environment that replicates existing social networks and promotes the extension of those networks to “new” nodes not constrained by geography, clan closeness, temporality, or cost to the node itself. Literature suggests that SNIS offer distinct advantages of greater connectivity at lower cost based upon the unique information systems advantages of digital proximity, recommender algorithms and efficient connectivity.

### 2.13 SUMMARY

Being human we are social animals. Technology development (smoke signals, letters, telegraph, telephone, televideo conferencing, on-line social media) over the course of human history has taken human social interaction from the synchronous face-to-face to the asynchronous online instantiations of digitally embedded social networks called social networking information systems. And, we are not only social as individuals on an inter-personal level. We also get together in groups and organizations and create networks of inter-organizational social behavior. Social actors in networks can be individuals and organizations.

Qualitative and quantitative studies of IP SNIS identify several socio-technical design elements inherent in these online platforms for Social Networks that promote the rapid adoption of the most successful of these Information Systems. In principle, these elements offer similar advantages to organizations that look to replicate offline social networks in an online digital domain. The IS researcher is tempted to exapt (Gregor & Hevner, 2013) directly from these
design elements. To do so, however, is to risk ignoring the subtle differences between how and why organizations and individuals interact in social networks.

IO SNT literature provides evidence that IO SNs are fundamentally different from IP SNs in several important ways. Specifically, Organizations interact in IO SN where (1) the organizing purpose is a desired economic outcome, (2) inter-organizational interaction is strongly restricted by concerns for resilient trust among potential organizational partners, and (3) efficiency in the volume and velocity of interactions must be mitigated by the risks associated with competitive information sharing.

IP SNIS literature provides evidence that the online instantiations of IP SNIS are fundamentally similar to and replicate many of the characteristics of offline IP SN. The IP SNIS literature also clearly shows that IP SNIS have several key differences to IP SN that account for their widespread use.

The key differences between offline and online IP Social Networks when juxtaposed by the key differences between IP and IO Social Networks provide a means of generating the specific propositions and provide the basis for the specific hypothesis of this study as indicated in the IO SNIS Research Model in Figure 3.

Consequently, this research proposes that:

Proposition 1: Organizational participants in offline IO SN will be attracted to an online IO SNIS because of the perceived benefits shown in the key differences between IP SN offline and IP SNIS; but, (includes Design Constructs 1, 2, 3)
Proposition 2: Organizational participants in IO SNIS will only do so if the SNIS artifact addresses the key differences between IP SN and IO SN. (includes Design Constructs 4, 5, 6)

General Hypothesis: IO SNIS will attract users only to the extent that they modify the most important IP SNIS features to address the key differences between IP and IO Social Networks.

The model can be tested terms of the importance of each of the key differences to an organization’s probability of IO SNIS use and to an organization’s anticipation of achieving a desired organizational goal or advantage based upon IO SNIS use. And, the key differences can be tested individually and in combination to evaluate each of the hypotheses.

Moreover, if an organization rejects IO SNIS use, the model offers the ability to measure why – is it because key SNIS differences are not attractive? Is it because key differences between IO

Figure 2: IO SNIS Research Model - Design Propositions
and IP are not accounted for in the artifact? Or, is it because of some combination of the key differences?
CHAPTER 3: RESEARCH METHOD

Our challenge in this research was to anticipate an IO SNIS artifact without evidence that a fully featured ensemble artifact existed. We decided that a positivistic research method was unlikely to generate specific knowledge for researchers and practitioners about the future of the as yet undefined IO SNIS because empirical observation of independent use of existing IP SNIS artifacts was unlikely to yield testable data with causal inferences for IO instantiations of SNIS. And, we identified that where IO online network sites did exist with one or more social tools, no objective set of design principles existed for comparative purposes between IO sites or to an ensemble IO SNIS artifact that organizations could reasonably be expect to use and find useful.

Action Design Research (ADR) as proposed by Sein et al (2011) offers a Design Research (DR) approach that emphasizes an integrated approach to building and evaluating innovative information systems artifacts through an iterative, collaborative effort between Action Researchers and Action Practitioners. ADR fundamentally seeks to “assist in solving the current and anticipated problems of practitioners” while making a theoretical contribution. (Sein et al, 2011, p 38) Its DR component emphasizes the design and build of innovative artifacts (Hevner et al, 2004). Its Action Research component emphasizes a cyclical process for the development of a client system that moves iteratively from problem definition to system design, build and evaluation and culminates in the identification of domain-specific and generalizable learnings. (Susman and Evered, 1978, p. 588)
AR accepts that by definition a researcher working with practitioners in situ acts upon and is acted upon by the organizational environment being studied. In such an environment, action researchers hold that it is impossible and in fact meaningless, to attempt to create a controlled positivistic study where one or more variables are held constant and causality is empirically tested. Consistent with AR, we hold that creating emergent IO SNIS artifacts cannot occur independently of the human beings in the organization and will be affected by the (uncontrollable) adaption of the organization to the artifact and vice versa (Susman and Evered pp. 584-585).

This research takes the combined ADR approach “for generating prescriptive design knowledge through … evaluating ensemble IT artifacts in an organizational setting”. (Sein et al, 2011, p 40) In the context of IO SNIS, where no one artifact can be shown to exist, the ADR approach provides a means to make practitioner embedded knowledge explicit in the full complexity of the artifact’s intended use environment while insuring the rigor of a theoretical (versus consultative) foundation. In this research we use prior knowledge in the form of empirical research into IP SNIS and IO SNT to provide a framework (Model of IO SNIS Design Principles) for evaluation and reflection with practitioners. We use the AR approach to iteratively adapt the framework and its design principles to add IO SNIS design knowledge.

ADR promotes rigor through the identification of innovative artifacts for a class of problems that generates knowledge about creating instances of artifacts that belong to the same class. Through ADR, this knowledge can be codified first as Design Principles and then as an Artifact. ADR emphasizes problem formulation from a theoretical foundation and relevance through the in-depth exploration of the class of problems in a practice domain with researcher and practitioner focused on a complex, content-rich problem example facing a specific organization.
The strengths of ADR also pose a concern for the generalizability of its findings. The research must use reflection of the researcher and practitioner to specify the learning in context and, typically, establish further research to generalize beyond the studied context for the same class of problems.

This research started with the classic ADR steps (see Appendix 1a). Our modified ADR method (mADRm) is described in Figure 4 and adds two important dimensions we found imperative to a robust ADR approach. First, the mADRm adds emphasis to the Diagnosing and Design process steps prior to Building, Implementing and Evaluating (BIE) an innovative artifact. We needed to demonstrate a rigorous problem formulation informed by theory and an expressed need in practice. We then needed to demonstrate a rigorous evaluation of design principles and insure that a fully elaborated IO SNIS Design Model emerged from the iterative interaction of researcher and practitioner. All of this was needed before we presumed to build and evaluate an IO SNIS artifact. Additionally, we realized that we were able to identify with practitioners several existing online PE network sites that claimed features consistent with some social tools (links, posts, blogs, etc.). We realized we could compare the design features from our research to the features of existing sites to evaluate the innovativeness of our proposed IO SNIS and to measure the proximity of any existing PE network site to our full-fledged IO SNIS design. This comparative evaluation offered a validation of the IO SNIS Design Principles Model and its elaborated design features as well as a means of recommending further research to build an IO SNIS artifact in the next – BIE - iteration of this ADR.

Second, the mADRm emphasizes the need for the AR cycle to occur at each step in the ADR method (see Appendix 1b). We found it imperative to not only cycle from Diagnosing to Evaluation and back but to also emphasize a disciplined AR reflection cycle at the Diagnosing
and Design steps before Build. Consequently, before leaving the problem formulation step, practitioner and researcher insured the evaluation of the actions in and outputs from that step (a model framework for example) and the specification of learning before moving on.

Our Diagnosing phase began with the rigor associated with a comprehensive literature review of Social Network Theory and of empirical research on existing Social Network Information System artifacts. We supplemented the theory based understanding with research into the existing knowledge of the IP SNIS class. We then selected a specific inter-organizational domain that is proven to rely heavily on social networks for the success of the organizations in the domain. Following a core principle of AR, we took an iterative approach to problem formulation until we were able to suggest specific design principles in our IO SNIS Research Model.

*Figure 4: Modified Action Design Research Model (mADRm)*
Our approach was to iterate at each phase of the ADR in order to insure that we were not building an artifact until its design features and principles had been vetted in situ with the Action Practitioner and Action Researcher actively engaged. And, we did not intend to generate a design without a problem formulation that took full advantage of existing theoretical and empirical research vetted for rigor and relevance against existing practice in a class of information system.

3.1 PROBLEM FORMULATION

3.1.1 Identifying and Conceptualizing the Research Opportunity

The phenomena of inter-organization (IO) social networks (SN) is widely researched and grounded in Social Network Theory (SNT). Social networks are widely used to examine how organizations 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 (Newell 2000). SNT research describes the ways that IO social network interaction is both similar to and different from inter-personal (IP) social network interaction (Faulkner & de Rond 2000; Galaskiewicz 2007; Kilduff & Tsai 2003; Monge & Contractor 2003; Provan et al. 2007). SNT also asserts that IO SN interaction can be one of the most productive forms of inter-organizational cooperation, since the organization’s network position (social connectivity and social interactions) is more indicative of its success than the actual characteristics of that organization (reference).

Organizations are already experimenting with IP SNIS inside the enterprise to improve organizational performance (Brzozowski 2009; Forrester 2010; Wu 2010) and a few inter-organizational online information systems are testing “social features” (like recommending connections to other members). Qualitative and quantitative studies of IP SNIS identify several
socio-technical design elements inherent in these online ensemble platforms for social networks that promote the rapid adoption of the most successful IP SNIS instantiations. In principle, these elements offer similar advantages to organizations that look to replicate offline social networks in an online digital domain. The IS researcher is tempted to “exapt” (Gregor and Hevner, 2013) directly from these design elements. To do so, however, is to risk ignoring the subtle differences between how and why organizations and individuals interact in social networks.

Our research model suggests that organizations are at once attracted to adoption of SNIS because of several perceived advantages over offline social network interaction, and, at the same time, repelled by IP SNIS because of key differences between the inherent nature of IP and IO Social Network formation as shown in the following IO SNIS Research Model (Figure 1).

We can therefore define our Research Question as: Given the widespread adoption of web-based Social Network Information Systems (SNIS) – like Facebook and LinkedIn – for use by individuals, why is there no similar digitally embedded social networking system that is being used widely by organizations in domains where social interaction is essential to the success of the organization?

And, our general Hypothesis: Organizations are at once attracted to adopt digitally embedded SNIS because of several observable advantages over “offline” social network interaction, and, at the same time, repelled by existing SNIS because of key differences between Personal (Interpersonal IP) and Organizational Social Network formation.
3.1.2 Inter-Organizational Social Network Theory

(Contributing Theoretical Basis)

There is not one established Social Network Theory (SNT). Instead, SNT is a composite of several sub-theories of social network interaction and connectivity with the majority of the research focused on the inter-personal level of analysis. SNT generally suggests that when organizations interact in social networks they do so at the inter-personal level. Perhaps unsurprisingly though, IO and IP interactions and connectivity have been found to differ. An extensive comparison of existing SNT literature provides evidence that IO SNs are fundamentally different from IP SNs in several important ways. Our research worked to consolidate these differences into a Framework of IO/IP Trade-offs (adapted from “An organizing framework for social media research”, Aral et al, 2013). When the differences are combined and consolidated we find that unlike IP SN, organizations interact in IO SN where:

- the organizing purpose is a very specific desired outcome (a specific, common goal)
- connectivity is strongly restricted by concerns for resilient trust among organizational partners
- the number and volume of interactions is restricted by competitive information sharing risks

We do not suggest that these are the exhaustive or exclusive differences between IO and IP SN. These three differences allow the formulation of the research model with research evidenced propositions for why and how IO SNIS might need to differ from IP SNIS. And, we find them to be readily understood by practitioners for the purpose of evaluating the model and partial artifacts. As the ADR process evolves we anticipate the addition to, modification of and possible deletion of each of these propositions for the IO SNIS artifact. Here we briefly explore each of these propositions.
P1: Organizing Purpose

First, it is important to recognize that the IO social network organizing purpose is fundamentally different from the organizing purposes of other types of IO networks. The organizing purpose in IO social networks is characterized by long-term, non-contractual cooperative behavior with the fewest “coordination” mechanisms - without formal agreements, with norms and behaviors, tending to parity, symmetry, and reciprocity (Newell 2000) - between representative individuals acting as organizational proxies based upon mutual obligation, loyalty, and resilient trust (Ring 1996). IO SN are markedly different from and frequently more effective than other IO networks such as the low trust environments typified by short-term, transactional markets (e.g. auctions) or by long-term, contractual inter-firm environments (e.g. supply chains). (Casson and Cox 1997) (See Table 1)

Second, Organizations form IO social networks in order to pursue a specific common goal such as (1) the joint exploration of innovation in products and services; (2) cooperation to share resources in ways that increase revenues, lower costs, and mitigate risks; and/or, (3) the efficient coordination of economic activities. (Aldrich 1990; Casson and Cox 1997; Grandori and Soda 1995, 2006)

IP SN form primarily to increase social capital as an end in and of itself and frequently measured in terms of the number and types of links and interactions. IP SNIS research, specifically, finds that the most common organizing purposes for IP SNIS are self-presentation, relationship initiation, and management of ongoing relationships (Dwyer 2007; Perotti 2011). These studies conclude that the principal organizing purpose in IP SNIS is “connecting” and the principal
measures of success are related to the number of ties, frequency of connection and volume of content posting (sharing). (Ellison et al. 2007; Grossman 2011; Joinson 2008; Stengel 2011)

Organizations exhibit some of these same behaviors among actors in social networks but fundamentally form to increase the probability of a desired outcome or goal that matters to an organization. Without that central organizing purpose IO SN are shown to disintegrate (Wilkinson 2006).

*Design Principle 1: Organizations will require a defined organizing purpose from any IO SNIS that achieves a specific goal of the organization before adopting the artifact.*

P2: Resilient Trust

A second key difference between IO and IP SN stems from the IO SNT concept of Resilient Trust. Ring (1996) states that the formation of inter-organizational social networks rests on “resilient trust”. In his definition, resilient trust is a combination of moral integrity and goodwill displayed by organizations toward one another over a period of time. He compares resilient trust inherent in inter-organizational social interaction to “fragile trust” inherent in market and firm interactions characterized by “low-trust mechanisms of coordinating economic activities”. (Ebers 1999)

IO SNs avoid the cost of low trust mechanisms typical to the market and the firm. They therefore foster trust among member organizations in the defined social network through more open exchange of information and development of long-term interactions leading to stronger connectivity - all without the costs associated with long-term firm-type interactions (Casson & Cox 1997; Ebers 1999; Ring 1997; Molm et al 2009) Resilient Trust equals predictability of the
moral integrity and goodwill of prospective network organizations (Ring 1996) and, conversely, reliance on classical contractual agreements increases distrust and opportunism. (Ebers 1999) As a boundary condition to the theory, inter-organizational networks that possess “fragile trust” are supported by contractual safeguards and generally lead to “arm’s length” short-term market interactions or expensively designed long-term inter-firm interactions typified by contractual agreements and bureaucratic costs of unified governance (Ebers 1999) Social networks therefore inherently provide organizations with a lower cost form of interacting as long as resilient trust is maintained. When resilient trust is eliminated this benefit of IO SN is lost as well and IO SN tend to disintegrate.

Levels of trust are not absolute in IP social networks. In fact, powerful central actors maintain significant connectivity to high and low trust partners without damaging their social capital. Evidence from research into online privacy in IP SNIS indicates that users of these systems also accept levels of disclosure and utilize privacy control measures in a manner inconsistent with the IO SNT concept of resilient trust. Throughout the literature surveyed, evidence suggests that many individuals do not act to protect confidential information – even when that information is their own – in spite of their professed commitment to guard their personal and professional information religiously. (Acquisti et al. 2008; Dwyer 2007; Young et al. 2009) IP SNIS owe much of their diffusion success to near-complete transparency of connectivity and interaction content. Numerous studies show IP SNIS participation correlating with near-complete transparency of actor’s networks to others in ways that promote self-presentation, looking at, looking up, and keeping up with others in and out of the actor’s 1st degree ties. (Joinson 2008) There is an inherent trade-off between the quantity and quality of connections in SNIS.
IP SNIS growth favors design elements that provide scale-free rapid growth in the quantity of ties and that increase the quantity of flows across those ties (shared content for example). IP SNIS design elements therefore tend to favor increases in the number of members, contribution of resources, and frequency of participation. IO SNIS, however, favor design elements that avoid connectivity to untrusted partners and limit visibility of one’s links (contacts) to trusted partners. Organizations often consider their 1st degree ties a competitive advantage not to be shared so promoting transparency of actor’s networks might yield the “unexpected effect” of lowering participation in the IO SNIS. Any artifact design that generates ties (connectivity) that promote low-trust interactions that will tend to lower IO SN participation. (Narayan & Cassidy, 2001)

*Design Principle 2: Organizations will require identification of trusted partners and control over connectivity to untrusted partners and their visibility of trusted partner interactions and contacts.*

P3: Competitive Risk of Information Sharing

Unlike individuals, organizations in social networks are constrained by competitive, legal, regulatory, proprietary, and compliance strictures governing their information sharing - even among trusted partners. When competitive risks are high (e.g. to resource imitability, sustainability, or mobility) the partner’s trustworthiness must be “near-absolute”. (Ring 1996) Even when trust is absolute, organizations can not afford to have information sharing that violates the law or statutes governing regulatory or compliance activities and have established controls in each of these areas for representatives who act as proxies for the organization in inter-organizational social networks. Research of IT leaders and key managers by Forrester (commissioned by Cisco) (2010) identified that one of the three most important potential barriers
to the online use of SNIS was “sharing too much” – typified by executives’ concerns over controls, privacy, confidentiality, legal, and compliance online.

Organizational participation in social networks is a delicate trade-off between the benefit of reciprocal exchange and the risk to competitive, legal, compliance, regulatory, and/or proprietary disclosures. Organizations utilize policies and procedures to control the nature and type of information shared in non-contractual social interactions. IO SNs frequently restrict the size of the community in order to insure high quality exchange of information and resource sharing while meeting appropriate governance requirements. Inefficient institutional and relational factors may also be at work restricting the number of participants in the network. In either case, restricting the sub-network size reduces the probability of finding non-incumbent partners that could prove to provide valuable reciprocal exchange.

_Design Principle 3: Organizations will require controls that segregate and filter the information shared in an IO SNIS while accepting the digital trace of inherent in all SNIS interactions._

### 3.1.3 IP Social Networking Information Systems

_(Prior Technology Advances)_

The provision of an information systems (IS) platform for social networks (SN) has been a prevalent topic of academic research. Articles on social software and internet based sites date to the mid-1990s and often explore the nature of the media and content on the sites. (Ellison 2007) In the middle of the last decade, though, the nature of the discussion morphed from a focus purely on content sites and how content sites are organized on the internet to a much broader discussion of how humans are organized on the internet (Mislove et al 2007). How humans are organized in social networks online is, to many researchers, much more interesting and difficult
to understand than even questions of the content they are most likely to consume. Kleinberg (2008) states that the SNIS artifacts effect the “convergence of social and technological networks” through “online spaces to form connections with others, build virtual communities, and engage in (social) behaviors” that are both governed by longstanding principles of social network interaction and modified by the nature of the information systems and their effects on styles and types of communication possible between actors. He further observes that the convergence offers researchers an ability to study social networks through the data available at unprecedented levels of scale and resolution.

Recent empirical research into IP SNIS finds that the best instantiations of IP SNIS provide tools that allow individuals to connect virtually online in much the same way they would in offline social networks with the added benefit of much lower thresholds of cost to connect over large distances, fewer time restrictions on communicating and sharing inter-personal content, increased numbers of weak ties in sub-networks leading to the introduction or more, different ideas, and greater expansion of connections (principally through inter-connectedness of first and second degree nodes) than with offline social networks (Dron 2007; Ellison et al 2007; Joinson et al 2008).

Through an exhaustive look at IP SNIS research (Mullarkey 2012), we are able to summarize the identified socio-technological design principles that current SNIS qualitative and quantitative research suggests have the most effect on the actors’ motivations to join and participate in SNIS (See Table 2). IP SNIS literature provides evidence that the online instantiations of IP SNIS are fundamentally similar to and replicate many of the characteristics of offline IP SN. The IP SNIS literature also clearly shows that (online) IP SNIS have several key differences to (offline) IP SN
that account for their widespread use. These differences can be summarized into three advantages:

- Efficient Connectivity;
- Digital Proximity; and,
- Recommender Algorithms.

P4: Efficient Connectivity

Since 1997, roughly 43 instantiations of online IP SNIS have evolved to replicate offline social network behaviors online. (Ellison 2007) The most prolific of these instantiations, Facebook, has connected more than 750 million people in roughly seven years. (See Ellison 2007, Figure 1 “SNS Launch Dates”) Inter-personal SNIS with Individuals as Users have managed to replicate existing social networks and to facilitate new connectivity of individuals to extended networks well beyond the geographic and clannish social network structures endemic to human history (Boyd 2008; Skeels 2009; Wu 2010).

However, the establishment and growth of IO trusted partner social networks, historically, is expensive and often limited by distance, travel, temporal scheduling, clustering, and incumbent membership. These “pre-existing” social relations (Eisenhardt and Schoonhoven 1996), positioning with respect to direct and indirect linkages (Gulati 1995; Kogut 1992), and/or positioning through incumbency (Nohria and Garcia-Pont 1991) tend to limit actor connectivity, interaction and social capital. And, discussions with business leaders and interviews in this study suggest that in some industries like Mid-market Private Equity, building and maintain social networks of trusted partners consumes 20-50% of resources and leaders are constantly looking for more efficient ways to develop connections that generate economic benefits.

*Design Principle 4: Organizations will require the efficient connectivity afforded by SNIS.*
P5: Digital Proximity

Historically, IO SN form due to (and are frequently constrained by) institutional and relational level factors such as geographical clustering (Herrigel 1995) and spatial “resource and know-how” clustering (Saxenian 1996). These interactions are strongly influenced by geographical and temporal proximity. Numerous industries – from Detroit’s “big three” to California’s “Silicon Valley” - in the United States are a product (in whole or in part) of the social interaction made possible by the geographical co-location of the organizations. The proximity leads to sharing of information, resources, and innovations that facilitated the growth of the industry and the success of the most important organizations.

As globalization of industries increases, the challenge of social connectivity among the key players in any industry – from automotive to electronics to pharmaceuticals to banking – becomes a significant impediment to the types of non-contractual, long-term relationships inherent in IO SN. Consequently, organizations are attracted to approaches that close the geographical and temporal divides affecting their social network growth and interaction.

*Design Principle 5: Organizations will require the digital proximity afforded by SNIS.*

P6: Recommender Algorithms

Two sub-theories in SNT focus on the challenge facing social network actors that seek to improve their position in the network by growing the number and nature of their ties. Burt’s (2004, 1992) theory of structural holes suggests that actors benefit when a tie is made between two of an actor’s previously unconnected first degree ties. Granovetter’s (1973) theory “the strength of weak ties” argues that many benefits occur to an actor that is able to interact with one
or more actors on the fringe of the actor’s immediate network. These “fringe” actors are weakly tied to the actor’s network and offer ties to a completely separate, typically heterogeneous network. Joinson’s (2008) study of IP SNIS identified the benefit of a singularly IS artifact – the recommender algorithm – based upon the ability of the software to identify opportune structural holes and weak ties in any digital network. Suddenly, SNIS offer the actor a practical tool for acting to close structural holes in the network. Moreover, given a particular stated interest on the part of the actor, recommender algorithms can identify other actors outside the actor’s established network that offer a “weak tie” benefits.

*Design Principle 6: Organizations will require the recommender algorithms afforded by SNIS.*

These key differences between offline and online IP Social Networks when juxtaposed by the key differences between IP and IO Social Networks provide a means of generating the testable propositions of this study as indicated in the IO SNIS Research Model in Figure 1. These propositions can then be used by the researcher and practitioner in the next steps of the ADR Method.

Our IO SNIS Design Principles can be summarized as follows:

*DP1: Organizations will require a defined organizing purpose from any IO SNIS that achieves a specific goal of the organization before adopting the artifact.*

*DP2: Organizations will require identification of trusted partners and control over connectivity to untrusted partners and their visibility of trusted partner interactions and contacts.*

*DP3: Organizations will require controls that segregate and filter the information shared in an IO SNIS while accepting the digital trace of inherent in all SNIS interactions.*
**DP4:** Organizations will require the efficient connectivity afforded by SNIS.

**DP5:** Organizations will require the digital proximity afforded by SNIS.

**DP6:** Organizations will require the recommender algorithms afforded by SNIS.

From Problem Formulation, the design principles can be added to the IO SNIS Research Model as shown in Figure 5. In theory, the model now offers researcher and practitioner design principles for the design of an innovative IO SNIS that can be iteratively evaluated in the ADR process for completeness and parsimony in general. And, the model provides a framework for practitioner and researcher using ADR to elaborate specific design features with application to a given organizational domain.

![Figure 5: IO SNIS Research Model - Design Principles](image_url)
3.2 RELEVANCE IN AN INTER-ORGANIZATIONAL DOMAIN

(The Problem as an Instance of a Class of Problems)

In theory, all organizations across all profit and non-profit sectors participate in some level of IO Social Networks. As in any ADR, the choice of practice domain is a critical step in the problem formation and design principle consideration. The goal is to demonstrate a domain in which the class of information system might or does exist, not to the exclusion of other domains, but as one demonstration of a domain with an opportunity for the artifact. Using the principles of SNT research defining IO Social Domains, our research identified a number of target offline IO SN including industrial concentration social networks (such as tire and rubber in Akron, OH, in the 20th Century), shared capital social networks (such as global oil and gas exploration), cooperative intellectual social networks (such as elite research institutions), and collaborative innovation social networks (such as silicon valley). One IO SN in particular stood out primarily in its singularity of purpose identified as the Mid-Market Private Equity (MMPE) domain. As discussed below, the organizing purpose of this domain is extraordinarily simpler in a relative sense and is easily articulated by all participating organizations. We also had the convenience of access to a target audience of actors in the MMPE domain.

In order to conduct the ADR method, discussed above, this study focuses on the Mid-Market Private Equity (MMPE) industry in the United States. In MMPE firms’ transactions involve enterprise values in the range of $10 to $250 million. The average MMPE organization completes 2-3 deals per year (371 organizations completed 879 deals in 2011 (Sutton Place Strategies 2012)). 75% of mid-market PE organizations completed just 1 or 2 deals in 2011. The eleven largest MMPE firms (by number of deals) completed an average of just 14 deals in the year. Consequently, an increase of just one or two deals completed per annum may mean a
substantial increase in an MMPE organization’s revenue, profitability, capital deployment efficiency, and return to investors. Unlike many sectors where the organizing purpose for the social network may encompass a number of domain specific goals, MMPE principals interviewed in the pre-study phase unanimously identified a universal goal: the addition of one or more deals meeting their investment criteria concluded per annum.

The key to each additional Private Equity deal is targeted deal sourcing efforts tied directly to market visibility of available deals. And market visibility is historically a function of the Inter-organizational Social Networks (IO SN) of the principals in a Private Equity organization. Initial “Diagnosing” Discussions with Partners at three larger firms, an MMPE merger and acquisition lawyer, and two principals at MMPE deal brokering firms confirmed that the dynamics of finding closely offered and proprietary deals is a universal challenge in the industry that relies on IO social networks for success. They further confirmed that deal quality, not quantity, determines success and drives the willingness of investors to support the deal funds of every firm. The strongest PE actors occupy central positions as influential SN hubs in the domain’s broad network of organizations (lawyers, accountants, bankers, business owners, brokers, analysts, and other PE organizations). They have more ties and more interactions with homogenous neighbors and heterogeneous outliers in the network. Several mid-size deal PE actors occupy important positions in sub-networks by specializing in a particular industry, geography, or type of deal (e.g. Distressed, Healthcare, Latin America) cluster.

The growth and maintenance of a PE’s IO SN is an expensive commitment of time and resources (on the order of 25%-50% of revenue) that includes meetings, site visits, tele/video-conferences, trade association participation, and multi-media marketing. Even with this level of expenditure, the typical MMPE firm has market visibility through its social network to an average of just
21.1% of the deals completed in its target deal landscape annually and 75% of all PE organizations in this space see only 12.1% of deals in their target landscape (Sutton Place Strategies, Deal Origination Analytics 2011).

The MMPE industry consists of roughly 350 of the most active firms. The unit of analysis for the study is the MMPE organization. Within a given MMPE organization several key players are involved in deal sourcing including the Vice President of Business Development and the Partners of the PE firm. Thus, each organization has one or more key informants that serves as a proxy for the organization and are practitioners for the purpose of our ADR. Each practitioner is chosen on the basis of observed and self-described knowledge of the social networking activities of the organization for the purpose of generating deal flow.

After Sein et al (2011) we identified a specific firm willing to collaborate iteratively through the phases of the action research. The client firm confirmed that, “as much as 50% of our resources are spent annually on networking to find deals”. Specifically, the representatives of the firm expressed an initial interest in the idea of evaluating an IO SNIS, or at least a robust model of the key propositions for an IO SNIS, to see if it could yield one or more new deals not possible through “normal” channels. The practitioners also quickly began to wonder if a model could help them with the existing problem of evaluating a variety of online “deal networks” in which they participated.

The firm fell squarely in the MMPE demographic. The firm had a $165 million fund and historically completed 2-3 deals per year including platform and add-on acquisitions. The firm’s 2013 “Year in Review” reported “another strong year” with the integration of three platform acquisitions, two add-on acquisitions, and the exit transaction for one of its existing companies.
At the time of the research conducted, the firm had six companies in its portfolio, four partners, two vice presidents, and assorted analysts and clerical staff. The practitioners defined the goal of the firm as, “Do good, profitable deals that grow our equity with every transaction.” The VP for deal sourcing defined success for his personal role in the firm as, “Find deals that meet our investment criteria and present the partners with deals that we could buy.” Further he said, “I get no credit for finding deals that already have gone to a bank-led process in an open auction format. I need to find narrowly brokered or proprietary exclusive deals. Exclusive deals through my network are the best. Also, brokered deals where the broker comes to us because they know our philosophy and they believe we will match their client needs.”

The firm inhabits a chosen space in MMPE focused on smaller deals for companies with $1+ million of EBITDA and enterprise values of $5 to $25 million. Ideally, these companies are nurtured and grown for sale to the next higher tier of MMPE firms. On a deal by deal basis, the deal location and generation activities appear to represent those consistent with a variety of MMPE firm sizes. The emphasis on the network of deal sources for the Partners and the VPs of business development appears to be a consistent driver of deals.

3.3 SUMMARY

This research method is inspired by a class of problem facing many organizations as they look to replicate offline social behavior online in an innovative class of artifact (SNIS) designed to meet the specific needs of organizational social networks. The design problem proves to fit the definition of a “wicked problem” (Simon 2000) where this research shows that a simple adaptation of the IP SNIS class of artifact into the IO domain will not solve the class of problem for IO SN practitioners. We suggest that a new, nascent (Gregor and Hevner 2013) design theory is needed to solve this design problem. The resultant design research model proposes an
entirely new IO SNIS artifact that will consist of the most useful design principles of IP SNIS instantiations and critical design principles inherent in IO SN behavior. ADR offers the researcher a method of testing and evaluating the design research model in a specific domain to (1) inform design features important to practitioners and thus to the build of the artifact, and, (2) to inform the design theory for this new class of innovative artifact to facilitate generalizability to other IO SN domains.
CHAPTER 4: DATA COLLECTION AND ANALYSIS

We (researcher and practitioner) initiated the data collection portion of the research with a formal research agreement and informed consent (consistent with Baskerville 1999). We conducted the research through collaborative interaction between the researchers and the client “on the spot” (p. 19). This research employs an iterative approach through the ADR phases of Diagnosing and Design for IO SNIS. Our research method consists of the Action Researcher and the Action Practitioner in situ performing the following sessions for the Diagnosing and Design ADR sessions:

• Session 1: Diagnosing and Knowledge Transfer
• Session 2: Research Model Testing and Design Principle Formulation
• Session 3: Test Innovative-ness of Designed Artifact
• Future Research: Build, Implement, Evaluate an actual IO SNIS Artifact

The researcher and the practitioner had a prior experience collaborating to locate deals using an emailed bulletin describing profiles of deals desired sent to a proprietary network of 5,000 highly networked, experienced professionals. This prior collaboration aided in the establishment of trust essential to the ADR approach and facilitated achieving consensus for the ADR approach and the collaborative work required to pursue sessions 1-3. Each session involved one or more hours of discussion and dialogue surrounding the subject of the session. Each session involved the principle researcher and the principle informant. The informant would frequently request
supporting information or documentation from other members of the firm as needed. Inevitably, the informant and both of the other members of the deal location team were involved in generating input.

ADR is highly dependent upon the qualifications of the researcher with the AR approach and with the domain under investigation. The researcher had significant prior experience as an industrial engineer using an action research approach to move from problem definition to action planning, action taking, analysis and evaluation, to specifying learning with and between organizations. That experience was augmented by the academic experience to generate a theoretical epidemiology for study critical to insuring that ADR was more than a consultative exercise. And, two colleagues with significant AR and DR experience and numerous peer reviewed journal articles, respectively, provided insight and oversight on the ADR interaction taken for this research.

Session 1 occurred in one sitting. Session 2 occurred over multiple sittings. And, Session 3 actually spanned a six week time frame. For Session 3, the researcher and practitioner each spent significant time reviewing each site online and comparing the site features to those identified by the model in order to conduct an in-depth review as per the evaluation form in Appendix 4. Session 3 occurred over several interactions to score the “fit” of each existing online PE inter-organizational networking artifact to the IO SNIS model’s design principles for an effective IO SNIS.

The researcher and practitioner took a disciplined approach to each interaction based upon an agenda proposed by the researcher and modified as needed through input from the practitioner or
as driven by the direction of the dialogue. Appendix 2 provides an example of this approach taken in the ADR interaction in order to maximize the “richness” of each research session.

4.1 SESSION 1: DIAGNOSING AND KNOWLEDGE TRANSFER

The Diagnosing and Knowledge Transfer session in our mADRm method is a multi-step process. The first step in Session 1 involved knowledge transfer from the researcher to the practitioner. The researcher started with a confirmation of the problem domain followed by a discussion of the theory-ingrained approach to the research.

We re-confirmed the MMPE domain as an ideal target domain within which to study the design of an IO SNIS artifact. The practitioner confirmed that in MMPE, the structure of one’s social network and place in the network are more important to success than the size of the fund or the personal intelligence and other characteristics of the actor. The Spectrum of IO Networks gave the practitioner a means to distinguish between different inter-organizational networks in a manner he had never considered before. He readily affirmed the nature of most of his network relationships as founded in long-term, non-contractual, mutually beneficial reciprocal relationships typical of social networks – especially for the relationships that had led in the past to proprietary (not auctioned) or closely-held deals he coveted.

We then reviewed the theory-ingrained Problem Formulation with a thorough review of the Dissertation Section 3.1 with the Practitioner including an introduction to social network theory, prior IP SNIS existing technologies research, the IO SNIS research model, and IO SNIS artifact creation as a desired outcome. We worked to gain a common understanding of how the existing research informed the definition of the key constructs for a successful IO SNIS (Dissertation Section 3.1.3). We reflected on the most important design features in successful IP SNIS.
The practitioner quickly grasped the theory around structural holes and the strength of weak ties. He quickly identified the activities he had taken in the past that led him to grow a connection to a “friend of a friend” and in some cases to reach out to connect to someone in an entirely different network with which he had limited contact. But, he freely admitted that he did not have a systematic way to grow his network to exploit the benefits these two theories suggest. The practitioner quickly understood how IP SNIS offered significant advantages over off-line IP SN but stated that until that moment, he really had not understood how the IP SNIS that he was a member of like Facebook and LinkedIn worked to dramatically expand and grow his social network through the three design principles in the model.

On the other hand, the practitioner also quickly expressed his concerns surrounding contact visibility to others. One issue he had with LinkedIn was the fact that anyone connected to him could “see” everyone else connected to him. He stated that he routinely rejected requests for connections in LinkedIn because he wanted to prevent some of his connections from gaining visibility to an interesting deal source such as a new link to an owner of a company considering a transaction.

Consequently, the researcher introduced the existing theory of IO SN and the key differences between IO and IO social networks. The practitioner readily agreed that the issues facing organizations forming social networks and those facing individuals had many similarities but clearly also had several significant differences. The IO SN research shared with the practitioner informed him of several differences (Dissertation Section 3.1.2). We then brainstormed other key differences between IP and IO social networks only to find that we returned to the same three differences or a variation on their theme. It seemed that the design constructs around
organizing purpose, resilient trust and competitive risk were time and again the most important ways that IO networks differed from IP networks.

The research objective at this step in the process was not to exhaustively establish new constructs but instead to insure that we vetted each construct for a common understanding of the definition and meaning of each to the research model. We verified that the abstraction of the construct to the model and the nascent design of an IO SNIS “made sense” to researcher and practitioner alike. That the abstraction was logical given the goal of the study and the problem domain and that upon reflection no better interpretation or miss interpretation of the six constructs was likely over the course of the rest of the study.

We then insured a complete understanding of the researcher’s knowledge of the problem domain and the nature of the practitioner’s PE firm. We reviewed and confirmed the facts presented in Dissertation Section 3.2. The MMPE domain information was vetted with the practitioner. We fact checked as needed together. The practitioner had not read the Sutton Place report fact concerning the number of deals in the domain typically seen be any MMPE firm (<25%). But, upon reflection against the deals he had shown his partners in the past year versus all deals done in the same period, he confirmed that he probably had only seen one in four before the deal was done. The researcher for his part gained a finer level of appreciation for the specific characteristics of the PE firm itself and its non-public deal origination activities.

As a diagnosing activity, the researcher and practitioner “checked” for existing IO SNIS designs and concluded that although several sites for PE firms were available online none of them appeared to claim the advantages proposed by the IO SNIS research model and none of the sites
appeared uniquely tailored to the needs of IO social networks as considered by the design constructs generated by the problem formulation.

The most significant immediate benefit to the researcher was verification that the practitioner had no knowledge of any examples of a “Facebook for PEs”. After five years in MMPE deal generation, he was aware of “two or three (web) sites out there that are trying to present deals to PEs” but nothing that was a full-fledged SNIS for inter-PE firm social interaction.

The practitioner stated that the immediate benefit of the introduction to the research and the research model was his ability to finally have an approach to understand how to consider these new online tools for deal origination. He said, “This is excellent. I needed something to help me evaluate all these different sites and until this moment I had no idea how I was going to do it.

Table 9: mADRm Session 1 Method Summary

<table>
<thead>
<tr>
<th>Session 1: Diagnosing and Knowledge Transfer</th>
</tr>
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<tbody>
<tr>
<td>Purpose: Confirm Problem Formulation with Practitioner including introduction of social network theory, prior IP SNIS existing technologies research, research model, and IO SNIS artifact creation as a desired outcome.</td>
</tr>
<tr>
<td>Knowledge Transfer</td>
</tr>
<tr>
<td>• Practitioner – understanding of SNT and reflection on most important features in successful IP SNIS.</td>
</tr>
<tr>
<td>• Researcher – understanding of MMPE generally and Practitioner’s organization specifically</td>
</tr>
<tr>
<td>Diagnosing</td>
</tr>
<tr>
<td>• Check for existing IO SNIS designs – negative</td>
</tr>
<tr>
<td>• Model as a tool to evaluate existing IO Sites</td>
</tr>
<tr>
<td>• Face validity of each key difference</td>
</tr>
</tbody>
</table>

This research is really going to help me do my job.” Thus, the first session affirmed the Problem Formulation, insured Knowledge Sharing and a common language for the research model and its
design constructs, and evidenced the diagnosis that the domain and the artifact under consideration were appropriate for each other and could provide novelty as a course of ADR. Table 9 summarizes the goals and data gathered in Session 1.

The next step was to understand, critique and evaluate the design principles evident in the IO SNIS Model.

4.2 SESSION 2: RESEARCH MODEL TESTING & DESIGN PRINCIPLE EMERGENCE AND ELABORATION

The goal of Session 2 was the abstraction and reflection on the IO SNIS purpose, scope and constructs to elaborate through guided emergence the key principle features essential to each design principle for the artifact. The output of this session is the fully Elaborated IO SNIS Design Research Model including any modification to or addition of Design Principles. The session focused on the model and its constituent parts to establish completeness and parsimony in its description of the design essential to the construction of a successful IO SNIS. Session 2 also insured the requisite depth of understanding of the model necessary for evaluating PE deal sites in Session 3.

In Session 2 the researcher acted as a participant-observer (Sussman and Evered 1978) working with the practitioner(s) to investigate each design construct. The purpose of this interaction was to reflect on the research constructs and experience, and, to abstract carefully and constructively the features essential to each construct. It is critical in this stage of the research to uniquely define each design principle and the key features without which the design principle could not be shown to meet the purpose of the IO SNIS. The researcher and practitioner took an iterative approach to the steps in Table 10 to allow the features to emerge from reflective judgment of
each construct, one construct at a time. The researcher-practitioner pairing also re-considered the validity of the construct to the IO SNIS design with each reflection and brainstormed the need for any additional constructs essential to a fully elaborated IO SNIS design.

The session resulted in the confirmation of the six design constructs but required a refinement of definition for each into a specific statement of the design principle involved. The session also leads to an elaboration of two key features essential to the good design of a desired IO SNIS artifact for each emergent design principle. Researcher and practitioner judged the fully elaborated IO SNIS design model adequate for both a reasonable build of an IO SNIS prototype and for a framework upon which other additive features might be vetted and incorporated over time by future research.

Table 10: mADRm Session 2 Method Summary

<table>
<thead>
<tr>
<th>Session 2: Research Model Testing &amp; Design Principle Emergence and Elaboration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Purpose:</strong> Evaluate and refine the IO SNIS Research Model including modification or addition of propositions. Develop the fully Elaborated IO SNIS Research Model.</td>
</tr>
<tr>
<td><strong>Abstract each Design Concept into a Design Principle</strong></td>
</tr>
<tr>
<td>• Review Research</td>
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<tr>
<td>• Comparison to Practitioner’s Experience</td>
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<tr>
<td>• Derive Conclusions</td>
</tr>
<tr>
<td><strong>Reflect on Key Design Features for each Design Principle</strong></td>
</tr>
<tr>
<td>• Practitioner-Researcher iterative reflection</td>
</tr>
<tr>
<td>• Feature definition and elaboration</td>
</tr>
<tr>
<td>• Simplify for Parsimony</td>
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<tr>
<td>• Discussion of Interactions</td>
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</tbody>
</table>

The next portion of this Chapter provides detail on each elaborated Design Principle (DP) moving from DP1 to DP6 in order and concluding with a discussion of the interaction among Design Principles consider by the research team. Our approach for each DP was to first review
and reflect on the research and the discussion of the related design construct from Chapter 3. We then compared the construct to the experience of the practitioner(s) and abstracted from the combination of construct and experience to a design principle and a couple of key design features we considered essential to the creation of an IO SNIS artifact. Out of necessity and by process in Design Theory and ADR, this data collection occurred through a qualitative and interpretive process of reflection and abstraction.

4.2.1 Design Principle 1: Organizing Purpose

Together, researcher-practitioner reviewed the existing research and the design principle description from Chapter 3. We reviewed and reflected on the concepts of organizing purpose and the difference between why organizations and individuals join social networks. We affirmed that in MMPE generally and for the practitioner’s organization specifically the organizing purpose was to identify a deal that met the investment criteria of the PE’s investment committee. Ultimately, the success of the IO SNIS artifact will be related to this organizing purpose. The IO SNIS will be used and useful to MMPE when it facilitates one or more additional deals that would not have occurred or would have been less likely to have occurred or would have been more resource intensive without the IO SNIS.

The practitioner’s experience confirmed that MMPE firms rely heavily on their social networks to research and identify new deals. The practitioners in this firm spend all of their time on either oversight of existing portfolio companies or on the search for new deals. The business development arm of the firm (half the firm) spends nearly all of their time and resources on the identification, vetting and presentation of new deals.
The social network activity in pursuit of this singular organizing purpose includes participation in trade shows, investor conferences, deal-networking events, tele-video conferencing, online searches, and one-on-one meetings and interviews with owners, sellers, brokers, and bankers. Limited Partners (LPs) provide the majority of the equity to MMPE and are very sensitive to the return provided over the 5-7 year life of any given equity fund. They look at the track record of the deal development activities of the firm and value strong deal generation and deal pipelines as key indicators of the MMPE firm’s future success. Without LP continued commitment to current and future funds, an MMPE cannot continue to exist and will not thrive. As the practitioner related, “Anymore, LPs only care about the longevity of the (MMPE) team’s time together and the quality and number of deals done historically when considering investment in the next fund.”

Together, researcher and practitioner conclude that IO social networking is essential to the identification and pursuit of each new deal and that MMPE firms will only use a social network online if it first and foremost offers the promise of incremental deal discovery and completion.

When discussing the organizing purpose the practitioner reflected on an existing PE network site called Axial Markets. This firm had been a member for three years and paid $15,000 per year to be shown deals that met the firms investing criteria profile. The practitioner said that in that time they had seen hundreds of target companies present to them by Axial but never had one led to completed deal. When he considered the Axial site in light of this design principle he concluded that a big reason for this lack of success was that although the site seemed to focus on the firm’s organizing purpose it did so with no controls on the quality of the deals it shared with the firm. From his perspective, the site was simply a “numbers game” that provided deal information with no filtering of sources or measurement of the deal’s proximity to the firm’s target deal. He said
that the site did not even ask the user for input as to the quality of the deals the firm looked at and rejected. Another observation made by the practitioner was that he knew of at least one case where Axial did not show them a deal that was just outside the investment profile of the firm. His frustration was that he found out later about the deal and realized that it was a deal they would have done and he believed Axial should have been “clever” enough to realize that fact if they had been more knowledgeable about the firm.

His conclusion upon reflection was that the IO SNIS would need to have features that shared all possible deals that might meet the PE firm’s investment criteria. And, that the IO SNIS would have features that measured and tracked the quality of deals shared getting input from the firm and using the input to learn to present better deals. This conclusion led the practitioner to contact Axial and end paid membership on the site. Axial’s response was interesting. The Axial representative agreed to stop charging the practitioner’s firm for membership but asked that they stay involved and help Axial “think about ways to improve the quality of deals”.

**DP1 Abstraction:**

Successful MMPE have strong social networks and constantly look for new means of exploiting their social networks to generate incremental deals that meet the investment criteria of the firm. Unlike individuals, MMPE will only expend the resources on an IO SNIS that affords a platform for accomplishing their most important activity – get a deal. The use and usefulness of an IO SNIS would be directly related to its ability to connect MMPE actors in a way that increased the number and quality of deals seen by the firm. The IO SNIS organizing design principle must create an understanding of the target deal criteria for any member MMPE firm through a combination of profiles, historical deal searches and pursuits, and actual firm deal history.
• **DP1: Organizations will require a defined organizing purpose from any IO SNIS that achieves a specific goal of the organization before adopting the artifact.**

• Generally, IO SNIS must support the specific social organizing purpose of the target organizational participants. IO SNIS the design must be general enough to target an organizing purpose and specific enough to allow participants to set and self-select the domain (MMPE deal profile, search history, and completion record) of this feature. In MMPE, the organizing purpose is the completion of a deal.

• In MMPE IO SNIS, a Quantity Feature is needed to insure that the PE firm sees all deals in its target deal space. This should be a setting for target investment deal profile(s).

• In MMPE IO SNIS, a Quality Feature is needed to allow the assignment of weights and values to deals that are presented based upon the firms assessment of the deal against the firm’s investment criteria.

### 4.2.2 Design Principle 2: Resilient Trust

Together, researcher-practitioner reviewed the existing research and the design principle description from Chapter 3. We reviewed and reflected on the concepts of resilient versus fragile trust and the generally high cost of interactions with low-trust partners.

The immediate reaction was that resilient trust with partners was primordial and essential to a deal getting done. According to the practitioners, many of the “best deals” had come from interactions with trusted partners who “knew us” (“what we do and how we do it”). In the last two years’ worth of acquisitions all deals had happened that way. Generally working with
trusted partners provides repeat business (“easy to know what to expect”; “there’s a track record”).

But, when we tested the construct more thoroughly, the practitioner also identified deals that had come from a connection “that we didn’t know, or didn’t know well” and “I want to be open to finding those ‘potential partners’ too”. Over the prior two years one divestiture and one add-on acquisition had occurred with fragile trust partners.

A key question is when the “potential partner” becomes trusted and that only happens over time with a specific deal opportunity in play. At some point (hard to quantify), trust needs to be established and the deal can firm up. According to the practitioner, this transition to a trusted relationship actually happens inevitably before a contract is signed on the deal. Trust needs to be established even for the basic confidentiality agreement to be put in place. Legally these agreements are hard to enforce so they are generally only signed once a level of trust is established. Once a letter of intent is in place, the target enterprise is open for inspection and due diligence work begins with complete transparency to operational and financial details of the business. The practitioner believes that even at this stage, contractual controls are minimal and trust is essential to the ultimate achievement of a deal.

A consideration became a need to connect to different levels of trusted partners at different points in time. The practitioner’s insight on P2 (Resilient Trust) was that he was prepared to interact in an IO SNIS to share information early in a process with someone (broker, banker, or PE) with whom he had a lower level of trust because he valued very highly any information that might lead to a proprietary deal. At an early stage in the interaction with a potential partner his information need to achieve P1 (Organizing Purpose – access to a proprietary deal) outweighed
his social network requirement for high resilient trust. He even said that the IO SNIS would need to insure that proprietary information from a brand new source for which he had no means of determining resilient trust would not be blocked. As he said, “We receive deals from folks we don’t know and every once in a long while they hit.”

For the design theory, this reflection lead the researcher and practitioner to the conclusion that during early deal exploration a low trust enabled design feature was highly desirable while later in the deal exploration a high trust enabled design feature would be required of an IO SNIS.

**DP2 Abstraction:**

There will be early exploratory activity where trust can be less important to insure openness to all potential deals. (Fragile Trust is okay) Where resilient trust exists, it will always be much quicker to move an opportunity into play. At a certain point, when the opportunity is in play and realizable, resilient trust (the partner “gets us” and “knows how we do what we do”) will be essential. At this point standard NDAs will also be enacted - but, these are really done only with partners you trust anyway. (Resilient Trust is essential) Once an agreement is in place, the parties will sign deal completion contracts and obligations.

**DP2: Organizations will require identification of trusted partners and control over connectivity to untrusted partners and their visibility of trusted partner interactions and contacts.**

- Generally, the organization will need to be able to specify (set) levels of trust among all of its partners.
• In the Early Exploratory Phase of deal origination the IO SNIS will need a feature that allows interaction with low and no-trust potential partners.

• Later in the deal Negotiating Phase the IO SNIS will need a feature that protects the contact information, interaction discourse, and, of course, nature of the deal between designated trusted partners.

4.2.3 Design Principle 3: Competitive Risk

Together, researcher-practitioner reviewed the existing research and the design principle description from Chapter 3. We reviewed and reflected on the concepts of “sharing too much”, reciprocal exchange, and privacy, confidentiality, legal, and compliance requirements for organizations.

The practitioner stated that the number one reason he would never use Facebook or LinkedIn as his PE social networking tool was the fact that they both make it too easy for anyone – competitor or otherwise – to see his contacts. We looked at LinkedIn together to gain an appreciation for the ease with which a casual observer can see “shared” connections, “people also viewed” connections, and “people similar to” connections. The only limitation on visibility to any given set of connections depends upon the controls the other individual has set. The “search company” feature also lets a casual observer identify first and second degree connections to the organization in question.

The perception for the practitioner is that “friend and foe alike can see my connections”. The practitioner believes that they are unable to limit visibility to “proprietary” connection such as small business owners that might be under cultivation for a deal transaction at some point in the future. Having a connection such as that visible to a competitor would risk the loss of
exclusivity with that actor. The comment was that the IO SNIS would need to allow the organization to set controls on visibility of its own profile and of any one or more of its connections. An approach that was discussed was similar to the “circles” feature in Google+. With a circle or neighborhood feature, the organization could place connections into a variety of neighborhoods and control visibility within that subset of the social network. The one concern with the approach for this practitioner is the amount of effort required to maintain and remember the constituency of any given neighborhood circle once established. Without these features, though, the practitioners believe the use and usability of an IO SNIS will diminish and less connectivity and less interaction will result.

The researcher asked the practitioners to also reflect on compromising information sharing that might be more (or less) likely with an IO SNIS. Several considerations resulted from the brainstorming that followed. Practitioners are very aware of the “digital trace” inherent in online communications and information sharing recognizing that “once it’s online, it’s always searchable”. The implication is that document records and traceability capabilities could increase the level of scrutiny possible by regulators, lawyers, compliance officers, etc. over any and all deal flow information. The result could be that organizations would be less inclined to use the IO SNIS for interaction fearing that any interaction (essentially any exchange of information) could be or become “incriminating” from a legal, regulatory, or compliance perspective. The practitioners believed that individuals and the organizations would want to place controls on certain types of messages (by content) and would want “alerts” to be given in advance of a “send” to error-proof the transfer of certain information.

Another consideration when dealing with compromising information sharing was the very real concern in the deal making domain that non-public, market moving information on a public or
pre-IPO company was released inadvertently. Since these types of information releases can lead to insider trading accusations and consequentially severe legal ramifications, the practitioners needed some level of protections incorporated into the IO SNIS that prohibited such disclosures where possible. The belief in this case is that a failure to provide these controls/prohibitions will lead to less use of an IO SNIS – especially by deal makers closest to and most aware of the confidential information.

**DP3 Abstraction:**

IO SNIS are designed to connect organizational actors across a social network and to facilitate social interactions (usually in the form of communication and information sharing). Nonetheless, unlimited visibility of the connections can lead to unwanted sharing of proprietary contacts, and, uncontrolled sharing of confidential information can lead to unwanted legal, compliance, or regulatory ramifications. In both cases, design elements are needed to insure the use and usability of the IO SNIS given the reality of organizational social network requirements.

**DP3: Organizations will require controls that segregate and filter the information shared in an IO SNIS while accepting the digital trace of inherent in all SNIS interactions.**

- Generally, settings must be established that enable significant organizational controls over the information flows. The IO SNIS will provide features that designate specific organizational representatives as having certain levels of approval over flows. Organizations will set requirements for alerts if certain types of information exchange occur.
• A Competitor Blind Feature is needed to prevent competitors from seeing the PE Firm’s network of trusted partners.

• A Regulatory Lockout Feature is needed to enable controls on market moving, insider trading, and other information exchange prohibited by the PE Firms compliance requirements.

4.2.4 Design Principle 4: Efficient Connectivity

Together, researcher-practitioner reviewed the existing research and the design principle description from Chapter 3. We reviewed and reflected on the concepts of efficient connectivity and the essentially unlimited, cost-free connectivity possible with SNIS generally. We then considered that capability in light of the needs of organizations interacting socially online.

The practitioner believes he is very careful about the connections he makes and generally believes he focuses on quality of connection over the quantity of connections. He needs an IO SNIS that makes it easy to connect and retain information on first degree contacts but he does not feel any pressure to simply grow his contact list. The practitioner then broke P4 into two parts – one for connection and the other for the “richness” of the interaction with the connection. In the second case, he determined that it was “Highly Important” that efficient connectivity exist between himself and those connections with which he had or needed a high volume and variety of interaction. Brokers are one example of a type of connections where high volumes of interactions might be well-served and lead to higher visibility of more different deals (“as long as the broker really gets what we do and what we’re looking for”).

Interactions with business owners, on the other hand, are perceived by the practitioner to be must less frequent but much more qualitative in nature. PE to Owner connectivity needed to be
especially beneficial to the owner and absolutely avoid the impression of “spamming” or “selling” owners and thereby alienating business sellers before a transaction could be considered. The implication is that a successful IO SNIS will provide a user driven designation for the type and nature of connections based upon a certain class of connection. This idea of a class of connections might or might not be similar to the circle or neighborhood discussed in DP3. The idea is to allow controls that restrict or open connectivity features on case by case basis between any two actors. For example, an “out bound” information “blast” from the PE firm would be handled one way for a broker class and another way for an owner class. Ironically, the result might well be that for a stronger social network and greater use of the IO SNIS, the efficient connectivity among connections might need to be made less efficient to increase effectiveness.

A second aspect of efficient connectivity is related to the sharing of a “profile” where the organization actively manages how others view it on the IO SNIS. A certain portion of the efficient connectivity afforded IO SNIS users is the ability to search and view other organizations in order to select organizations that might be useful to connect with. The practitioner pondered the need for different profiles for different classes of “lookers” believing that what attracts an owner might be different than what attracts a broker or banker or other PE firm to connect.

**DP4: Organizations will require the efficient connectivity afforded by SNIS.**

- Generally, settings must be established that enable significant organizational control over connectivity. These will include now common features for “looking” (at, up), “keeping up”, posting, profiling, communicating, and “sharing” will all be important to IO SNIS.
• A connectivity Quantity Feature is needed to facilitate interaction with the widest possible range of actors in the PE firms established target domain. Allows high volume, low quality information exchange.

• A connectivity Quality Feature is needed to facilitate controlled channels or classes of connections when important deal information is exchanged.

4.2.5 Design Principle 5: Digital Proximity

Together, researcher-practitioner reviewed the existing research and the design principle description from Chapter 3. We reviewed and reflected on the concepts of digital proximity and how they might overcome the historical constraints of time and geography to social network connectivity.

The practitioners were open to and sceptical of the benefits of this design principle for increasing the use and usability of an IO SNIS. The practitioners clearly believe that they are a product of the physical productivity they maintain with trusted partners when they look at their existing social networks. Thus, the practitioners’ experiences are consistent with the findings of SNT. Organizations cluster in social networks that are heavily influenced by their current or past proximity to one another. Just so, the practitioners could point to a significant portion of their existing social networks as stemming from alumni relationships, prior organizational affiliations, and geography (Chicago, Cleveland, Central Florida, etc.).

When pressed by the researcher however, the practitioners’ reflection was that while many deals come from these historical clusters, a large minority (about one quarter of deals) come from connections that do not have the benefit of this physical proximity history. The suggestion that was very interesting to the practitioners was that maybe to get more different additive deals they
needed to find more interesting non-physically proximate connections. The brainstorming that followed considered how the IO SNIS should replicate all the offline tools that happened when actors were proximate and provide a similar tool for social connectivity and interaction to build online. A useful and well used IO SNIS would therefore enable digital proximity in way that promised more visibility to deals and the addition of incremental deals that would not have happened without the digital proximity feature(s) of IO SNIS.

*DP5: Organizations will require the digital proximity afforded by SNIS.*

- Generally, digital connectivity will supplement (not replace) physical proximity. Readily available digital proximity features will be needed in the IO SNIS for communication by mail, document, voice, video, bog and post. Controls on these features will be required for tailoring to an organization’s level of trusted partner and information sharing risk tolerance.

- An Asynchronous Feature will be required that offers an ability for the PE Firm to communicate (interact) without the limitations of time, geography and cluster boundaries that previously limited SN growth and development.

- A Synchronous Feature will be required at times to facilitate real-time interaction for the PE Firm to other actors – especially during certain phases of diligence and the negotiation of specific deal points.

**4.2.6 Design Principle 6: Recommender Algorithms**

Together, researcher-practitioner reviewed the existing research and the design principle description from Chapter 3. We reviewed and reflected on the concept of intelligent recommendations that can be programmed into an IO SNIS to promote the establishment and
growth of the online social network. We recognized that the number of algorithms to promote network connectivity and interaction are nearly unlimited but generally fit into a category associated with growth of the network either with homogenous neighbours or heterogeneous outliers.

The practitioner is convinced that an IO SNIS that effectively closes structural holes provides the “best bet” for deal generation. At the same time, he sees a real benefit to recommender algorithms in an IO SNIS that cleverly make connections outside his normal network where he might have an interest. He envisioned some sort of “profile” for non-normal deals that could be used by an algorithm to suggest heterogeneous actors with which to connect.

The other interaction the practitioner identified is the interaction between IO SNIS features supporting P3 (Competitive Risk) and P6 (Recommender Algorithms) that may create a conflict. He believes a successful IO SNIS will somehow firewall key contact information it uses in recommender algorithms from public display and competitors’ access expressly because his actual list of contacts is extremely proprietary information that must be protected in any IO SNIS.

In the brainstorming session, the researcher and practitioner suggested starting slowly with recommender algorithms. The ideas is to “walk before we run” so that new entrants to the social network are not immediately overwhelmed with all kinds of unsolicited recommendations. The approach of LinkedIn to offer a way to pursue recommendations was considered preferable to the Facebook “in your face” push recommendations on everything from new friend connections to sponsored advertisements.
**DP6: Organizations will require the recommender algorithms afforded by SNIS.**

- Generally, recommender algorithms will be designed into successful IO SNIS. These algorithms will focus on the promotion of connectivity with significant controls available to the organization for specifying network and contact connection visibility levels by partner trust level.

- A Close Structural Hole Feature will be needed to systematically strengthen the PE Firms network. The quality and quantity of interactions should grow and the probability of seeing and pursuing additional deals should grow.

- A Connect Weak Tie Feature will be needed to propose connections to the PE Firm likely to introduce innovative deal opportunities and new market information.

### 4.2.7 Fully Elaborated IO SNIS Research Model

The revised and Fully Elaborated IO SNIS Research Model was an output of this phase of the ADR and resulted in Figure 6. At this point in the research method, the design principles have moved from being purely a construct of theory and existing literature and into the realm of practitioner tested principles for the design of a MMPE IO SNIS. The Fully Elaborated IO SNIS design principles each have an added level of definition with two dimensions (Figure 6).
Practitioner and researcher determined that P1 (Organizing Purpose) must have a design dimension for both quantity and quality. We determined that there is value in an IO SNIS with a design feature that provides visibility to many different deals (Deal quantity) and a design feature that shows the PE Firm deals that closely match their investing criteria (Deal quality). These are two important dimensions of the Organizing Purpose Design Principle.

Similarly, we determined that Efficient Connectivity needed a design feature that facilitated connectivity to the largest possible number of buyers, sellers, owners, and brokers – especially early in the exploratory phase of deal research. Only in this way could the firm cast the widest possible net. The size of this “net” of potential partners could be increased through the
Recommender Algorithm design features; and would be moderated at later stages in the deal progression by the Resilient Trust design features. Consequently, the ideal IO SNIS would have design features that promoted a wide network of potential partners (P4) in the early exploratory phase of a deal search when low trust is acceptable (P2) by tapping into algorithms that close structural holes and other algorithms that add outliers connected only through weak ties (P6). In this fashion, flags can be set in the IO SNIS artifact design for the desired level of interaction among the design features.

At a later stage in the deal origination and evaluation when resilient trust is required, the quality of connections becomes paramount and the PE Firm must be in a position to limit transparency and limit connectivity of partners to those, and only those, trusted and essential to the deal under consideration. At that point, the firm will require an IO SNIS that gives precedence to the later negotiating feature in Resilient Trust and activates the quality feature in Efficient Connectivity and the competitor blind feature in Competitive Risk.

The dimensions of Digital Proximity – synchronous and asynchronous features – appear to be equally important to the well-designed IO SNIS for different reasons. Deal discovery, evaluation, and transaction processes each require long periods of asynchronous interaction interspersed with intense synchronous events. The asynchronous events include initial introductions, administrative paperwork exchange, and standard communications. The synchronous events include “face-to-face” interactions that build trust, final negotiations of terms, and closing a deal. The PE Firm needs an artifact that is equally adept at both dimensions of Digital Proximity with an ability to act as circumstances of the deal process dictate.
The dimensions of Competitive Risk – competitor blind and regulatory lockout features – are also equally important to the well-designed IO SNIS and need to be flags that the PE Firm can set and retract fluidly depending on the stage and nature of the deal under consideration. The reality in the MMPE domain is that a competitor on one deal can become a partner (co-investor, buyer, or seller) in the very next deal – and, they might be going on simultaneously. Likewise, different types of deals (private, public, international, equity, strategic) have different regulatory requirements and will need different lockout features. So, for example, a deal involving a publicly held company on an exchange will need to comply with shareholder information sharing requirements, blackout periods, and issues concerning forward looking statements made by the parties to the deal.

In all of these ways, the Fully Elaborated IO SNIS Model offers design features that individually and in combination increase the functionality of the artifact and the likeliness that the design IO SNIS artifact is used by PE Firms. As a consequence of the ADR method, a significantly richer understanding of the design principles can be developed and more fully dimensioned features can be designed.

4.3 SESSION 3: TEST INNOVATIVENESS OF DESIGNED ARTIFACT

Session 3 was a multi-step process that occurred over several weeks. The researcher and practitioner first brainstormed the known PE deal origination or information sharing web sites for evaluation. In this step, we did not attempt to limit our consideration of sites. Several of the sites were well known within the firm and others were known only by reputation or through general awareness and a Google search. We identified ten sites that provided or promised some form of PE network interaction and one or more social networking tools to facilitate interactions
online. The second step was to complete an evaluation of a site familiar to both researcher and practitioner – Axial Networks – in order to insure a common approach to evaluating the sites in light of the elaborated IO SNIS Research Model.

We pursued a consensus approach with the practitioner determining the final score for each feature on each site and the researcher questioning to gain understanding and test the objectivity of scoring. From that joint evaluation, the researcher was able to establish an evaluation form that worked for that first evaluation. The basic form used and sites evaluated are described in Appendix 4.

Table 11: mADRm Session 3 Method Summary

<table>
<thead>
<tr>
<th>Session 3: Test Innovativeness of Designed Artifact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purpose: Evaluate the available MMPE online networking site artifacts against the IO SNIS Research Model.</td>
</tr>
<tr>
<td>Reflect on the design fit of existing online networking artifacts.</td>
</tr>
<tr>
<td>Establish the case for modifying an existing or building new to create an IO SNIS artifact consistent with the design principles and features.</td>
</tr>
</tbody>
</table>

Session 3 elicited a number of significant contributions to the research. Ten different sites were evaluated against the IO SNIS Research Model. Each PE Networking site was scored from 1 to 7 on the perceived proximity of that site’s design features to the twelve features of an ideal IO SNIS. Each site therefore could be measured in terms of the number of features that met the desired levels of each of those features where 7 out of 7 was a perfect fit. And, each site could be scored with an average distance from 7 for all twelve features evaluated. Table 12 describes the data collected in Session 3.
Table 12: PE Online Networking Site Evaluation

<table>
<thead>
<tr>
<th>Design Principle</th>
<th>Target Level of Importance</th>
<th>Axial</th>
<th>Deal Cloud</th>
<th>Apex Fund</th>
<th>Pehub</th>
<th>Trusted Insight</th>
<th>Deal Nexus</th>
<th>FDX Capital</th>
<th>Zanbato</th>
<th>Deal Gate</th>
<th>Re:Sci</th>
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</thead>
<tbody>
<tr>
<td>Organizing Purpose 1 - Quantity</td>
<td>7</td>
<td>7</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td>5</td>
<td>7</td>
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<td>3</td>
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<tr>
<td>Organizing Purpose 1 - Quality</td>
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<td>6</td>
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<td>3</td>
<td>1</td>
<td>5</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Resilient Trust 2 - Early Exploratory</td>
<td>7</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>5</td>
<td>7</td>
<td>1</td>
<td>3</td>
<td>1</td>
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<tr>
<td>Resilient Trust 2 - Later Negotiating</td>
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<td>1</td>
<td>7</td>
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<td>Competitive Risk 3 - Competitor Blind</td>
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<td>3</td>
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<td>5</td>
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<td>1</td>
<td>3</td>
<td>7</td>
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<td>Recommender Algorithms 6 - Transparency:Structural Holes</td>
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<td>1</td>
<td>5</td>
<td>1</td>
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<td>5</td>
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<tr>
<td>Recommender Algorithms 6 - Transparency:WeakTies</td>
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<td>1</td>
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</tr>
</tbody>
</table>

| x Average Distance to Target | -4.417 | -2.750 | -5.667 | -5.333 | -2.167 | -3.000 | -4.000 | -4.333 | -3.333 | -5.000 | -0.000 | -3.333 | -3.333 | -5.000 |
| y Number of Features at Target | 3 | 2 | 0 | 0 | 2 | 2 | 4 | 0 | 0 | 2 |

No site had more than four of the twelve design features completely achieve the targeted level for that feature. The PE online networking sites were generally far from achieving something close to a 7 on all features. The site “Trusted Insight” came closest overall in average separation from the ideal across the twelve features and yet remains fairly distant from the required feature level and set of a target IO SNIS. Figure 7 provides a visualization of the gap between the best existing PE networking sites and the target IO SNIS based upon design features.

The practitioner and researcher were struck by the sense that this graph explained why none of the sites had become the “Facebook of PE SNIS”. In fact, this particular firm has never had a deal result from interactions on any of the ten sites in existence. That is not to say that others have not had some success with this primordial goal of MMPE firms. But it does coincide with the reality that each of these sites fall short of a full-fledge ensemble IO SNIS artifact and it explains why most firms, according to the practitioner, participate in multiple sites.
This situation is strikingly similar to the trial and error experience of developers pursuing IP SNIS before Facebook happened into the combination of design features that attracted the largest population of individuals to replicate online their offline social networking behavior. Prior to Facebook, it was extremely common for individuals interested in online social networking to be members of multiple SNIS (Cyworld, Friendster, Myspace for example). And, it was equally likely that most potential participants found these sites to be so far removed from the ideal IP SNIS that most never joined.

As the practitioner said, “We knew we were spending a fair amount of time and money on these PE networking sites and we knew we were not getting any deals from them. What we didn’t know, and now do, was why there weren’t any good deals and whether we should persist in using the sites or not.” The IO SNIS model not only aids in the evaluation of the sites but also in
the understanding of what the sites were missing. The practitioner is determined to evaluate all new sites and any modifications to existing sites in light of the IO SNIS Model. As the head of business development said, “If some PE deal site propositions our business from now on, the first thing we will do is see how closely it comes to the model. If it is not really close, we’re not interested.”

As Figure 8 demonstrates, each site provides a little of what is needed for the typical MMPE firm but no site has even a partial fit in all twelve features. Moreover, many of the sites are dominant in the same feature or set of features. Consequently, the consolidation or combination of sites cannot be expected to create one complete IO SNIS artifact that is reasonably close to the target IO SNIS set of design features.

![Proximity to Target Level of Importance by Design Feature](image)

*Figure 8: Proximity to Target Level of Importance by Design Feature*
Without all design features represented in a site, we also cannot expect that desired interactions among features at various steps in the deal origination (i.e.: P2, P4, and P6 combination of features early in a deal) to be met with any of the given sites or combination of sites. We also recognize that some of the sites might not aspire to be the ensemble IO SNIS artifact described in this research. Several may in fact carve out very lucrative business models by being specialists in a target area of online IO networking behavior. To the extent they do so, they will naturally fall into either side of the IO Network Spectrum discuss earlier – Transaction or Firm – and will not compete to be the IO Social Network online.

4.4 SUMMARY

Our conclusion is that (1) only by incorporating each of the twelve features to the greatest degree possible, and, (2) by accounting for interactions among features at various stages in a deal process can an IO SNIS artifact expect to leapfrog the PE deal site competitors with a full featured artifact that is most likely to attract the largest set of organizational users.

The reality of this significant separation between existing artifacts and a true ensemble IO SNIS is not really surprising at all. The fact that a gap in literature and practice exists was identified early in this research. This research certainly supports that observation. But, it also clearly shows that IO SNIS designers are following the same “trial and error” path of the early IP SNIS teams. Instead IO SNIS builders could use a nascent design research theory-ingrained and practice-inspired IO SNIS Model to build an artifact that starts, by design, as close as possible to the anticipated artifact. This research shows that a full featured, ensemble IO SNIS artifact, once built, is much more likely to meet practitioner’s needs.
At this point, PE networking sites and their users have a clear choice - continue to develop an SNIS design that incrementally adds “social” features to the existing IO site artifact – through experimentation, user elicitation, clever innovation, and/or good luck – or, start with the end in mind and design-in all of the design principles and at least the twelve design features identified through the ADR process to build an ensemble social networking information system in informed by the design knowledge of the Fully Elaborated IO SNIS model.
CHAPTER 5: RESULTS AND CONTRIBUTIONS

This chapter contains a review of the nascent IO SNIS design theory, results, contributions, limitations and boundary conditions, and concludes with future research directions. The research answered our Research Questions:

RQ1: Why are IP SNIS successful? What are the design principles that make them attractive to users? What are the key features afforded by technology online that differ from the offline features of social networks?

RQ2: How are IO social networks fundamentally different from IP social networks? What design principles must be accounted for in IO SNIS design? What IP SNIS features will be desired by users of IO SNIS?

The diagnosing and problem formulation stages of the research clearly answered the first half of RQ1 and RQ2. Through ADR, the artifact design constructs thus identified were shown to be important to the MMPE problem domain and were transformed through reflection and abstraction into a set of design principles and their underlying features that begin to answer the second part of each RQ. The fully elaborated IO SNIS Research Model informs the developers for the build of a full-fledged ensemble SNIS artifact that promises to fill the gap in digitally embedded online social networks for organizations.
5.1 SUMMARY OF FINDINGS BY DESIGN CONSTRUCT

Overall the research method provided strong support for the general propositions suggested in the gap analysis and nascent IO SNIS design theory:

*IO SNIS will attract users only to the extent that they modify the most important IP SNIS features to address the key differences between IP and IO Social Networks.*

Using an ADR approach it is clear to the practitioner and researcher alike that a full-fledged ensemble artifact that replicates offline inter-organizational social behavior will attract organizations as users if, and only if, the IO SNIS incorporates the most attractive IP SNIS features while addressing the key difference between IP and IO social networks. The study found that the unique advantages of an online SNIS instantiation were not sufficient reason for organizational users to participate in existing IP SNIS. The unique aspects of IO social behavior are such that an entirely different design theory is required to innovate in the digitally embedded social network space of inter-organizational behavior. Simple adaptation of existing “Facebook”-type SNIS will not solve the problem. The study also found that the simple addition of social tools to organizational network sites will not solve the problem. An entirely new class of artifact, IO SNIS, needed to be conceived, modeled and investigated to solve the very real problem of inter-organizational social behavior online.

The Face Validity of the IO SNIS model (and its key constructs) is very high. Throughout the study we (researcher and practitioner) repeatedly confirmed the three principles advantages of IP SNIS and the three critical differences between IP and IO SN. Each of the six was considered at each of three iterations of the analysis as the ADR moved from Diagnosis to Design Principles and finally to Design Features. At each iteration of the research we re-posed the question: Are
there other key advantages/differences that we need to consider? Do the identified key advantages/differences still hold? How can we elaborate on each key advantage/difference to improve the richness of design guidance on form and function of an IO SNIS? The resultant evaluations and reflections created a much richer description of the design principles and led to a further elaboration of design features for the MMPE domain. A summary of the design theory constructs and our findings are indicated in Table 13.

This study confirmed Proposition 1: Organizational participants in offline IO SN will be attracted to an online IO SNIS because of the perceived benefits shown in the key differences between IP SN offline and IP SNIS; and, Proposition 2: Organizational participants in IO SNIS will only do so if the SNIS artifact addresses the key differences between IP SN and IO SN.

The reflection in the MMPE domain chosen for the study forced the researcher and practitioner to develop a more-“fully elaborated” set of design features. The design knowledge thus identified was shaped by the organizational setting, use, and participants of one MMPE firm.

The final stage in ADR is to formalize the learning into generalizable principles. Generalization is a fundamental challenge in ADR because the data collection and analysis focuses on a specific organizational setting and a specific IT problem. To move from the specific to the general, Sein et al (2011) suggest that the researcher must:

1. Conceptualize a generalization of the problem instance
2. Conceptualize a generalization of the solution instance, and,
3. Propose a derivation of the design principles (knowledge) from the ADR outcomes.
Table 13: Summary of Findings by Design Principle

<table>
<thead>
<tr>
<th>Design Construct</th>
<th>Finding</th>
<th>Design Consequence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design Construct 1a: IO and IP social network organizing purposes are measurably different.</strong></td>
<td>Organizations form social networks with a specific set of goals that enhance the survivability of the organization.</td>
<td>The IO SNIS must support the specific organizing purpose of the target organizational participants. Since offline IO SN tend form around specific purposes, in IO SNIS the design must be general enough to target an organizing purpose and specific enough to allow participants to set and self-select the domain of this feature.</td>
</tr>
<tr>
<td><strong>Design Construct 1b: An information system designed to support an IP SN, will not necessarily provide the environment for an IO SN.</strong></td>
<td>IO SN practitioners reject the use of existing IP SNIS because they do not replicate offline IO SN behavior in the online environment.</td>
<td>Certain design elements of the existing IP SNIS are attractive to organizations. These must be identified and adapted to the organizational IO SN use setting.</td>
</tr>
<tr>
<td><strong>Design Construct 2b: Organizations will not interact in IO SNIS where connectivity to all is favored over connectivity to the few.</strong></td>
<td>Organizations require a significantly higher level of control over connectivity and visibility of connections than individuals in SN require.</td>
<td>Settings must be established that enable significant organizational control over connectivity.</td>
</tr>
<tr>
<td><strong>Design Construct 2a: Organizations, by definition, interact in social networks of trusted partners where relationships are defined by resilient trust.</strong></td>
<td>Resilient trust is crucial to IO SN. If it is non-existent, the IO network dissolves into low(er) trust market or firm networks and the interaction no longer provides the benefits inherent in IO SN.</td>
<td>Certain design elements will be required that allow organizations to specify trusted partners, with different levels of trust, at different points in time in the relationship.</td>
</tr>
<tr>
<td><strong>Design Construct 3: Organizations will require specific controls over interactions that restrict information volume, velocity and content in ways that IP SNIS do not.</strong></td>
<td>Information control is essential to participation in IO SN. Information is fundamental to organizational survival and mitigation of risk. In social environments organizations are still very sensitive to competition, competitive advantage, laws, regulations, and standards.</td>
<td>Settings must be established that enable significant organizational controls over the information flows. We can also anticipate features that designate specific organizational representatives as having certain levels of approval over flows. And, we can expect requirements for alerts if certain types of information exchange occur.</td>
</tr>
<tr>
<td><strong>Design Construct 4: Users of IO SNIS are attracted to SNIS because of digital proximity not found in offline social networks.</strong></td>
<td>Digital connectivity supplements physical proximity. It also offers an ability for the organization to span time, geography and cluster boundaries that previously limited SN growth and development.</td>
<td>Certain design elements from IP SNIS that promote digital proximity will be beneficial to the promotion of organizational participation in IO SNIS. Controls on these features will be required for tailoring to an organizations level of trust, risk and the IO network’s organizing purpose(s).</td>
</tr>
<tr>
<td><strong>Design Construct 5: Users of IO SNIS are attracted to SNIS because of recommender algorithms not found in offline social networks.</strong></td>
<td>Systematically closing structural holes and investigating interesting weak ties are two tangible benefits to organizations with digitally embedded online social networks.</td>
<td>Recommender algorithms will be designed into successful IO SNIS. Controls on these features will be required for tailoring to an organizations level of trust, risk and the IO network’s organizing purpose(s).</td>
</tr>
<tr>
<td><strong>Design Construct 6: Users of IO SNIS are attracted to SNIS because of efficient connectivity not found in offline social networks.</strong></td>
<td>Organizations seek to replicate offline social behavior online and will use IO SNIS to connect to existing partners in the new environment. Organizations will also, as have individuals, use the IO SNIS to seek out new connections by looking at and looking up other potential partners. The ease of look up, look at, keep up, and self-presentation are important to desired users of an IO SNIS.</td>
<td>Now common features for “looking” (at, up), “keeping up”, posting, profiling, communicating, and “sharing” will all be important to IO SNIS. Controls on these features will be required for tailoring to an organizations level of trust, risk and the IO network’s organizing purpose(s).</td>
</tr>
</tbody>
</table>
As we stated early in the research method description, this research started at the very beginning of diagnosing the problem and problem formulation that was not just practice inspired but also theory ingrained. The literature review (Mullarkey, 2012) was an exploratory research effort in its purest form. Only after the analysis of existing research on innovative SNIS artifacts and on Social Network Theory did researchers recognize a significant gap. Social networks have individuals and organizations (groups of individuals) as actors but the existing IT artifacts – SNIS – only “solved” the challenge of replicating individual inter-personal behavior online. No SNIS existed to replicate inter-organizational behavior online. That gap motivated the ADR research and it provides an opportunity to suggest that the unelaborated IO SNIS model does represent design knowledge for the broader class of problems facing organizations as they seek to replicate offline social network behavior online. Our caveat would be that this is true of domains where inter-organizational social behavior and networks are proven to contribute significantly to organizational success.

The question then is: does the fully elaborated IO SNIS design model offer generalizability for the class of problems. Clearly the elaboration of the model occurred with this organization in this domain setting. We argue that the evidence shows that, at least in this setting, the core design principles were “elaborated” upon in ways that inform IO SNIS builders to create at the very least a prototype MMPE IO SNIS. Logically, the design features described in the elaboration position an MMPE IO SNIS to solve the problems facing this firm and many, if not all, of their peers. In fact, we would encourage a next step in this Design Research be to build the alpha prototype MMPE IO SNIS based upon the elaborated design model. And then, use an ADR process with a broader set of MMPE organizations to iteratively evaluate, reflect and
further elaborate the beta version for a market test with a sample of real MMPE organizations in real social interactions.

As any software designer and IT system builder will attest, at a certain point in the elaboration process enough information is available to build a system. We argue that the rigorous approach taken to this ADR application in a very relevant IT problem area for practitioners satisfies the level IT developers commonly seek prior to an alpha build. More exhaustive elaboration, without a working example, at this stage of the DSR runs the risk of diminishing returns for the systems developers and may create a confusion of opinions over features of features.

Outside of the MMPE domain we are less confident as researchers that the elaborated model generalizes well. Where the design principle elaboration directly integrates a core premise of Social Network Theory we are more inclined to believe that those features will translate well outside the MMPE domain. So, for example, the elaboration for quantity and quality of interactions in design principle P4 is completely consistent with SNT where the number and type of interactions effect the position of the actor in the network and dictate both importance and power. The elaboration of P6 for structural holes and weak ties is similarly informed by SNT and evident in all successful IP SNIS and can be assumed to translate well outside the MMPE domain.

Also, where a design principle elaboration directly relates to a core relevance of the SNIS artifact we are more inclined to believe those features will translate well outside the MMPE domain. For example, synchronous and asynchronous features of SNIS elaborated in P5 have re-written the SNT rules around the importance of physical proximity to position in the social network. This design principle appears to be a fact of online behavior in many problem domains - including
gaming, email, conferencing, education, etc. – and may be relevant to most IT on the web. In any case, it appears highly likely that these elaborated design features will translate well to SNIS outside the MMPE domain.

The elaborated design features for P1, P2, and P3 are less obviously translatable outside the MMPE domain. It may be the case that these design principles must be elaborated upon in every new problem domain. Our research suggest each is an important design consideration for IO SNIS developers but since each domain will undoubtedly have a different organizing purpose, for example, it is unrealistic to expect that design features that promote one or more deals annually will translate well to an inter-organizational social network domain where success is measured in terms of innovations created or capital efficiency. On the other hand, the elaboration of P1 for deal quality and quantity may translate well to social networks where success is measured in partnering for drug discovery. We can suggest the same observations with regard to design features elaborated for P2 and P3. Maybe they will and maybe they will not translate directly from MMPE to other IO SN domains.

The advantage of the general IO SNIS Design Model is that it forces designers and developers to ask the question for each design principle – certainly P1, P2, and P3 – how does this domain differ from MMPE or even more importantly how will we elaborate the principle into specific design features relevant to the particular domain?

5.2 CONTRIBUTIONS

The research, gap analysis, design research model, ADR method, and analysis in this study offer a number of promising results that we find inform the IO SNIS practice and research domain, nascent IO SNIS design theory, and IS streams of research.
5.2.1 Innovative Artifact

This research informs researchers, developers, and practitioners of the design for an Innovative Artifact – IO SNIS. We create a new knowledge artifact by defining the concept of IO SNIS. Ultimately our goal as IS researchers is to “fulfill the dual mission of advancing theory while producing knowledge to support IS practitioners in solving current and anticipated problems” (Sein et al, 2011, p. 53). Our goal in this research was to propose the design of an innovative artifact (Hevner et al, 2004). Our IO SNIS knowledge artifact is manifest in a set of design principles for the general class of artifact and a set of design features specific to a specific inter-organizational domain. We show that the artifact has a purpose, fills a real problem class, and provides new knowledge that informs researchers and practitioners alike.

We identify and measure the gap between existing IO networking sites with or without social tools and the design of a true ensemble IO SNIS. We apply the knowledge artifact represented by the IO SNIS Research Model to the evaluation of actual artifacts and describe the ways their designs fall short of the solution set of features needed for a successful IO SNIS. The application of the model to a practical example of IO networking sites was shown above to be immediately useful to practitioners. As importantly, we suggest that this approach provides a novel use of design theory to generate evaluation, learning and reflections using real-world artifacts even when the artifact under consideration has yet to be built.

The creative causation inherent in the leap from our gap analysis to an elaborated set of design features is a source of novelty. As discussed in Gregor et al (2013), frequently moving from the awareness of a problem to a “candidate solution” requires an inventive leap of thought on the part of the researcher. That leap occurred in this research when we recognized the reality that if simple adaptation of existing IP SNIS artifacts could solve the problems inherent in IO social
behavior online, they would already have done so. The other creative leap was to recognize that existing IO SN research could inform artifact design. The ultimate juxtaposition of existing research with an innovative artifact created the original design concept and the novel design research model evolved from there. We note that throughout this research, we maintain a clear vision of this first design idea that “underpins” the work. (see Gregor et al 2013 for a discussion of creative causation, purpose and scope in Design Theory)

We create a nascent design theory that can be tested and expanded as researchers identify additional beneficial features of SNIS and as they assess any additional essential characteristics of IO social behavior from research of practice. In the course of this research we created several components of a design theory (Gregor et al 2013, Gregor and Jones 2007). We identify a specific purpose and scope for IO SNIS – the online replication and extension of offline IO SN behavior. We conceived a “candidate solution” and generated a Research Model to represent the key constructs of the design theory. The nascent theory went from a general diagnosing of the problem and the artifact class to specific knowledge of an IP SNIS instance domain and of IO SNT. We abstracted from the specific theory and existing practice to a more general knowledge constructs and principles for the design of full-fledged abstract domain of digitally embedded inter-organization social networks online. We used ADR as essentially a tool for reflection on the design generally and then in the context of the MMPE domain. Our IO SNIS design theory thereby evolves with the iterative process of reflection and learning experienced by the researcher and practitioner during the study. The resultant IO SNIS design theory provides new knowledge of the design principles for form and function. Our theory rests there, nascent and untested with the Build, Intervention and Evaluation phase of the IO SNIS yet to come.
5.2.2 Innovative Research Model

The Research Model provides an innovative approach to the abstraction of design principles and features for an entirely new IS artifact by juxtaposing an existing technology with existing kernel theories to conceptualize a new IO SNIS artifact. The model provides a visualization of the research problem and facilitates the elaboration of the artifact from design constructs to principles to features over the course of the Diagnosing and Design phases of the ADR method. The Research Model offers IS researchers looking to conceptualize new artifacts a roadmap for the evolution of the design with a grounding that is theory-ingrained and practice-inspired.

The Research Model takes a pragmatic, practitioner-researcher involved, iterative approach to the guided emergence of new knowledge for the design of a new artifact. The combination of the Research Model and the ADR method combine in a way that informs research and practice.

The research model also provided the organization a means to evaluate any IO Network site. An immediate benefit to the practitioner from the model, as experienced by the participants in the study, is the ability to use the model to “test” any and all IO networking sites against the fundamental requirements of a full-fledged ensemble IO SNIS. As with the participants, any organization can now evaluate a proposed artifact and decide if it exhibits “enough” of the essential design elements of a complete IO SNIS to make it worthy of investment. As the practitioner stated, “We now know why our existing IO networking sites don’t really meet our needs and never lead to a deal.” “We won’t spend money to join another site until it meets all the features required in our [IO SNIS] model.”

We answer Sein et al’s (2011) request for specific examples utilizing ADR to investigate innovative IS artifacts. In their ADR MISQ article, these researchers were forced to essentially
“re-interpret” an existing study (Volvo CMS) and establish a fit to ADR that allowed them to diagram the stages of ADR (see Appendix 1A). In this study, we are able to investigate an entire class of artifact for a class of problem from start to finish for the first time using ADR. ADR is used from Diagnosing and Problem Formulation through to Reflection, Learning and Generalization of Outcomes. With future research on the Build and Evaluation of the IO SNIS artifact, a complete ADR study example will be manifest.

We generate an emphasis on diagnosing and design steps in ADR (prior to Build, Implement, Evaluate) that encourages greater focus on the fullness of Design Science Research in the method. Sein et al’s (2011) article emphasizes an iterative approach and regular reflection and learning through the stages of ADR. But, we noticed that the stages (Figure 1, p. 41) and the discussion of ADR remained relatively silent on the movement from Problem Formulation through Design prior to Build, Intervention and Evaluation. The fundamental approach in IS of Systems Analysis and Design is familiar to all researchers and places an emphasis on the importance of Design to Build. IO SNIS research without existing artifacts to evaluate dictated we start with Diagnosing and move to Design prior to contemplation of Build, Implementation and Evaluation of the artifact. As such, this research study complements the research by Sein et al (2011) with a richer description of the Diagnosing to Design stages of ADR.

5.2.3 New Stream of IS research

The stream of research into digitally embedded social networks of organizations is completely new and otherwise unexplored in IS Research. As described in our review – Table 4 - of the research by Agrawal et al (2008), digitally embedded social networks of organizations online is an entirely new stream of IS research not previously discussed. This stream of IS research is complementary to streams that involve inter-personal, inter-professional and intra-organizational
SNIS. This stream of IS research has a parallel in offline inter-organizational social network research as previously discussed. This stream also fills a “void” in inter-organizational information systems research between the very commonly IS researched areas of Market and Firm IO systems as shown in Table 3. And, this IO SNIS stream of IS research offers the opportunity for the researcher to anticipate practice and for the DSR researcher to actually build and evaluate a new class of artifact.

This research stream presents IS Research opportunities into Social IO that could be as significant as Market & Firm IO information systems research has been historically. Significant IS research into ERP, CRM, DSS, CSCW, Knowledge Management, Cloud Computing, IS Outsourcing, Digital Markets and many other areas has occurred over the last thirty years almost entirely focused on either the long-term, contractual inter-organizational networks of the firm or the short-term non-contractual inter-organizational networks of the market (auction). The inter-organizational long-term, non-contractual, reciprocal, collaborative inter-organizational social networks offer a wide open field of research for the IS community. What would a “social” Decision Support System look like and how might it improve the IO SNIS? How can organizations in a social network benefit from a collaborative, reciprocal cross enterprise resource planning system? What would a Social ERP look like and how might it address the incredible resource management issues facing global energy exploration resource collaboration requirements? How is the Cloud lowering the potential cost to develop and manage an IO SNIS for every IO Social domain (not just MMPE) and how can innovations in Cloud security systems answer the IO SNIS design criteria for resilient trust and compliant information sharing?

If we use IO Social networks to achieve lateral thinking in our IS research opportunities we can expand both theory and practice for years to come.
5.3 LIMITATIONS AND BOUNDARY CONDITIONS

Two key limitations of this research are a direct result of our choice of ADR. First, ADR assumes that in complex organizational situations a controlled experiment demonstrating causality is improbable if not impossible. Instead, ADR embeds the researcher “in situ” to observe and to interact with practitioners in the domain with all the complexity inherent in the most difficult organizational problems worth solving. The resultant research tends to be interpretive and qualitative without empirically proven casual relationships among variables.

To combat this limitation, the researcher (as we did in this research) guides the research with several activities. First, this study was grounded in an extensive exploratory research that identified a gap in academic literature and practice. The researcher then established the theoretical and conceptual basis for studying the gap prior to a consultation with the practitioner. The researcher vetted the problem, domain, research model, and design emergence at each step in the ADR process with the practitioner(s). The process affords high face validity to each of the aspects of the resulting artifact design as a trade-off to causal proof of hypotheses about a theoretical design not grounded the way ADR grounds this research.

A second limitation in ADR is to generalizability outside the domain. Because ADR focuses on one problem in one or more cases in a specific domain, generalizing the results to other domains can be problematic. In this study, the research relies less on generalizability to multiple domains than on abstraction of the design principles from MMPE to other inter-organizational social domains. Starting, as the study did, with a general research model that built six key constructs before guiding the emergence of a dozen fully elaborated design features and six design principles might offer the possibility that the core constructs can inform an IO SNIS application.
in another domain as long as researcher, practitioner and developer follow a similar feature elaboration approach.

A third limitation of this study is the use of one case. One case, however rich, cannot pretend to adequately represent the population. This case using one MMPE firm to validate the problem, the need for the artifact, and the elaboration of a nascent design will not have elaborated all possible or even all essential design features of an ideal IO SNIS artifact. Our argument in this research is that, fortunately, developers do not need an exhaustive set of design features to begin to build what become highly successful innovation information systems. From an Agile design and development approach common today, over specifying the design can be a significant barrier to the build of a successful artifact in a timely manner. Having enough of a design to satisfy the initial build and test of the innovative artifact is enough to motivate an Agile team. This research proposes that the elaborated design features for an MMPE IO SNIS are sufficient to thus motivate an agile build of the artifact.

An important boundary condition of this study is that the MMPE IO SNIS artifact has yet to be built, implemented and evaluated. The BIE phase of this research is beyond the scope of this dissertation but is considered an essential element of future research directions that will undoubtedly lead to the next level of an emerging design elaboration.

A final boundary condition on this research is the nascent level of the IO SNIS design theory. In this research we make explicit a prescriptive approach to design and develop an MMPE IO SNIS artifact in a specific IS class of artifact for a specific organizational problem. We define the class of artifact and the problem domain. We conceptualize the innovative artifact from existing kernel theories and existing innovative information systems. We reflect and abstract from theory
and practice to generate a set of constructs that are elaborated into defined design principles with practitioners in a specific IO SN domain. Nonetheless, we have yet to develop the artifact and guide the emergence of the design principles into the specific form and function that will more fully inform the Design Theory.

The IO SNIS Design Theory is considered substantive and therefore bound to the context studied (Gregor et al 2013). But, it remains somewhat unclear as to whether that context is the greater domain of all IO SNIS or the lesser domain of just MMPE. We argue that one benefit of the approach taken in this research for IS researchers is that by defining Design Principles generally prior to Design Features specific to the chosen domain, we may in fact offer the artifact builders two meaningful sets of knowledge. The clever artifact builder can create standardized modules for each of the design principles in the IO SNIS Research Model and simply fine tune interfaces, language, and functionality to the design features of the given domain. In this manner, we can imagine a general platform for IO SNIS and specific instances for MMPE that make it separate and distinct from an IO SNIS instance for a Silicon Valley social network or an Oil & Gas Exploration social network, etc.

The IO SNIS Design Theory is also nascent in that it can be expected to grow and evolve with the actual construction of the IO SNIS artifact. More knowledge will inevitably be added as to principles of form and principles of function. In fact investigating many instances of IO SNIS in many domains will probably be essential to a more formal design theory.

As discussed, the research is bounded by the nature of the ADR approach and the use in this study of one MMPE firm in one study. We argue that these limitations, though real and important, are offset in part by the richness of knowledge generated in situ and in the full
complexity of a real business environment. We also find that the DP and DF appear to be sufficient to begin to build and test an ensemble IO SNIS artifact. We favor a level of efficacy afforded by a more rapid design-build-evaluate iterative cycle over attempts to replicate the research model with multiple MMPEs or in multiple problem domains.

5.6 FUTURE RESEARCH DIRECTIONS

An ADR cycle to Build, Intervene, Evaluate (BIE) an MMPE IO SNIS is a logical future direction of this research. Ideally, this research effort could result in the construction of a full-fledged ensemble artifact used by and useful to MMPE organizations.

The broader stream of research into digitally embedded social networks of organizations is also a target rich environment for further IS research. The IS researcher has only to think of the research occurring on every facet of IP SNIS to realize that each of those sub-streams of research could have a parallel in IO SNIS research. Another parallel set of sub-streams of IO SNIS research might be taken from the extensive IS research into every facet of IS platforms for the IO Firm networks (i.e.: Decision Support, Enterprise, etc.) and to find parallels in the IO SNIS research.

An additional future direction of the current research may be to complete an elaboration iteration of the unelaborated IO SNIS Design Model in another domain where inter-organizational social behavior is proven to be instrumental in the success of organizations in that domain. A domain such as the collaborative, long-term, non-contractual social networks for intellectual property sharing in Silicon Valley or the global exploration resource sharing in the Energy Sector might (will undoubtedly) provide different elaborated features on the same six Design Principles.
We encourage DR researchers to also consider using our approach to induce from existing innovative artifacts and related theories, one or more possible artifact gaps that can be positioned on the IO SNIS Design Model framework and evaluated with practitioners for problem resolution.

Finally, IO SNIS research can also contribute to IO SNT. SNIS generally and IO SNIS specifically will not only replicate existing social networks online, they also offer the possibility of augmenting those social networks in ways not previously observed. This “augmentation” of the social network can inform the body of Social Network Theory.

5.5 SUMMARY

This research supports practitioners pursuing solutions to the online replication of offline inter-organizational social network behavior. It also uses the ADR approach to generate new knowledge – specifically a model of generalizable design principles and domain specific design features - that advances theory in the DR discipline. From observations of innovative artifacts and Social Network Theory, we are able to induce a new class of artifacts – IO SNIS – and a theoretical model for the design of that type of innovative artifact. We use the interpretive research approach of ADR to combine (1) the DR focus on innovative artifacts that are relevant because they actually solve IT problems facing practitioners and (2) the AR focus on testing the theory in the complexity of a specific organizational context for a target domain needing to solve the class of problem (online inter-organizational social behavior).

Our iterative approach that emphasized evaluation, reflection and codification of learning allowed us to modify the ADR process and elaborate from the general (SNIS Design Principles) to the specific (SNIS Design Features). This research offers ADR researchers a repeatable
approach when it is important that the research focus heavily on diagnosing and design in advance of build and evaluate. The elaborated model offers IO SNIS developers an opportunity to develop a full featured, ensemble alpha build for the MMPE domain. It also offers practitioners in the domain a means to continue to evaluate existing and new artifacts for fit to the desired features of a full-fledged IO SNIS most likely to replicate their offline social behavior online.

We extend the ADR work of Sein et al (2011) with a specific case and an extension of the ADR process. We extend Agrawal et al (2008) analysis of digitally embedded social networks to include the overlooked inter-organizational social network. As discussed in Baskerville & Meyers (2004) this research employs a simple two-stage process – theory formulation in a diagnostic stage and collaborative change (and theory testing) in a “therapeutic” stage. Finally, we find this research adheres to the desired structure of an Action Research Journal Publication (Figure 1, p 360) as identified by Mathiassen et al (2012).
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APPENDIX 1A: THE ACTION DESIGN RESEARCH (ADR) METHOD (ADR)

Sein et. al., 2011

Problem Formulation (Practice Inspired Research, Theory-Ingrained Artifact)
- Identify and conceptualize the research opportunity
- Formulate initial research questions
- Cast the problem as an instance of a class of problems
- Identify contributing theoretical bases and prior technology advances
- Secure long-term organizational commitment
- Set up roles and responsibilities

Building, Intervention, and Evaluation (Reciprocal Shaping, Mutually Influential Roles, Authentic and Concurrent Evaluation)
- Discover initial knowledge-creation target
- Select or customize BIE form
- (Building the IT artifact, Intervention in the Organization, and Evaluation – BIE)
- Execute BIE cycle(s)
- Assess need for additional cycles, repeat

Reflection and Learning (Guided Emergence)
- Reflect on the design and redesign during the project
- Evaluate adherence to principles (in parentheses above)
- Analyze intervention results according to stated goals

Formalization of Learning (Generalized Outcomes)
- Abstract the learning into concepts for a class of field problems
- Share outcomes and assessment with practitioners
- Articulate outcomes as design principles
- Articulate learning in light of theories selected
- Formalize results for dissemination
APPENDIX 1B: THE CYCLICAL PROCESS OF ACTION RESEARCH (SUSMAN & EVERED, 1978)

1. Diagnosing (Identifying or defining a problem)
2. Action Planning (Considering alternative courses of action for solving a problem)
3. Action Taking (Selecting a course of action)
4. Evaluating (Studying the consequences of an action)
5. Specifying Learning (Identifying general findings)
6. Repeat
APPENDIX 2: RESEARCHER-PRACTITIONER INTERACTIVE ADR SESSION 1

1.0 We discussed AR research in Information Systems as follows:
   1.1 Presented and described "The cyclical process of action research" from Susman & Evered 1978 (p. 588).
   1.2 Described the active nature of the participation between researcher and informant practitioner and the distinction between consulting and theoretically founded research as per Baskerville (1999).
   1.3 Described the table "Criteria for the Principle of Change through Action" provided by Davison et. al. 2004 (p. 75). Checked with informant for understanding of the principles and received affirmative validation that ADR was understood and that the informant was motivated to pursue this research.

2.0 Next we presented the theoretical framework for the research as follows:
   2.1 Described the key concepts of Social Network Theory
      2.1.1 Special emphasis on the concept that the place in the network suggests more about the success of the organization than the specific characteristics and capabilities of the organization. Checked with informant for common sense confirmation of the SNT proposition and received affirmative validation that this proposition does hold true in the MMPE industry based upon the informant's experience.
      2.1.2 Discussed the positioning of inter-organizational social networks as per our table "Spectrum of Inter-organizational Networks" compiled by us from our literature review with specific reference to research by Ebers, Grandori & Soda, and Neuwell. Special emphasis was placed on the non-contractual, long-term relationships existent in typical MMPE social networks. Checked with informant for understanding of the principles and received affirmative validation that this proposition does hold true for the informant's firm and more broadly in the MMPE industry based upon the informant's experience.
      2.1.3 Further discussed theoretical assertions in SNT surrounding structural holes and the strength of weak ties. Checked with informant for understanding of the principles and received affirmative validation that this proposition holds true in the MMPE industry based upon the informant's experience.
   2.2 Provided a copy of and described the table "Motivation for SNIS and Key Differences between IO SN (offline) and IO SNIS" compiled from our literature review of all SNIS research. Checked with informant for understanding of each of the principles and received affirmative validation.
   2.3 Positioned the specific focus on IO SNIS using the diagram of the "Hierarchy of the Levels and Types of SNIS". Checked with informant for understanding of the principles and received affirmative validation.

3.0 Next we discussed a model for evaluating IO SNIS as follows:
   3.1 Asked the informant: Are you aware of any MMPE focused IO SNIS?
      3.1.1 Informant stated that he was not aware of any specific examples of a "facebook for PEs" but he was aware of "two or three (web) sites out there that are trying to present deals to PEs". Specifically the informant cited awareness of www.axial.net and www.dealcloud.com (both previously identified by the researcher as existing in the MMPE domain.)
   3.2 Asked the informant: Have you evaluated these sites for use by your firm in achieving your goal?
      3.2.1 Informant stated that he had reviewed the sites briefly but had not "signed up" as a member of either.
      3.2.2 Informant further stated that he "was supposed to evaluate the sites to help with deal generation" but that he "really didn't have any good way to do it (the evaluation)" and that he "had not had time to do it properly".
   3.3 Asked the informant: Are these or any other sites full blown instantiations/examples of the IO SNIS described from the prior research presented by the researcher to this point?
      3.3.1 Informant responded that he was not aware of such an IO SNIS in existence.
   3.4 Asked the informant: Do you have a specific method or model to evaluate these or any other sites in terms of their ability to help you achieve your goal and/or further grow your MMPE social network?
      3.4.1 Informant responded that he had no such method or model.

4.0 Next we discussed the IO SNIS Research Model as follows:
   4.1 Reviewed each of the parts of the model to emphasize how it derived from prior research and theory and how it might be used to inform the development of an IO SNIS. Check with informant for understanding of each of the pieces of the model, their genesis in prior research, the model's usefulness in evaluating existing MMPE focused online information systems, and the model's potential to define a new MMPE focused information system that would embody a full-fledged IO SNIS.
      4.1.1 Informant stated “This is excellent. I needed something to help me evaluate all these different sites and until this moment I had no idea how I was going to do it. This (ADR effort) is really going to help me do my job.”

Session 1 Completed October 15, 2013
APPENDIX 3: RESEARCHER-PRACTITIONER INTERACTIVE ADR SESSION 2

Session 2 (First Cycle, First Informant)

1.0 Researcher confirmed informant’s continued motivation to pursue the ADR.
   1.1 Confirmed – even more excited about the process. Wanted to know if we intend to actually build a working IO SNIS.

2.0 Researcher follow-up on any information promised from prior session.
   2.1 Informant provided information on number of deals in prior years.

3.0 Researcher asked for reflections on the IO SNIS Research Model as follows:
   3.1 What’s missing?
      3.1.1 Informant did not have any immediate missing propositions. We agreed that some may arise as we rate each proposition and evaluate existing partial IO SNIS artifacts.
   3.2 What’s extraneous?
      3.2.1 Informant saw the model as simple, clear and easy to understand.
   3.3 What makes sense?
      3.3.1 Informant said the model makes sense to him.
   3.4 What doesn’t make sense?
      3.4.1 Informant wanted a reminder of each of the propositions and their meaning. Some confusion between “Resilient Trust” and “Competitive Risk”.

4.0 Researcher and informant then re-draw the model.
   4.1 A re-drawing of the model actually occurred after ranking importance of each proposition.
      4.1.1 The addition of P7 – “Richness of Interaction”
      4.1.2 The addition of Interactions among propositions.

5.0 Researcher then asks informant to weight the importance of each proposition to:
   5.1 Achievement of the goal.
      5.1.1 This was our focus in this session.
   5.2 Designing the ideal IO SNIS.
      5.2.1 This was not covered in this session.
   5.3 Explained the use of likert scale.
      5.3.1 Confirmed informant’s understanding.

Session 2 Completed December 10, 2013
APPENDIX 4: EVALUATION FOR EXISTING ONLINE INTER-ORGANIZATIONAL NETWORKING WEB SITES AGAINST TARGET IO SNIS SESSION 3

Purpose of this Research Step: Evaluate a few PE networking information systems (sites) to see how well they meet each of the six design features/principles discussed above.

PE Networking Information Systems for Evaluation:

http://www.axial.net/
https://www.dealcloud.com/
http://www.apexfundservices.com/
http://www.pehub.com/
https://www.thetrustedinsight.com/
http://www.dealnexus.intralinks.com/
http://fdxcapital.com/
https://zanbato.com/
https://www.dealgate.com/
https://www.dealcloud.com/
https://www.relsci.com/

Provided: IO SNIS Model and Explanation of Each Design Principle (separate page)

Process: You will read through and understand the six design principles and the relevant twelve design features. Then go to each of the PE Network IS sites in turn and answer the questions below for each site/system. There is no right answer. Responses will not be “graded”. All answers should be given based upon your perspective. You are encouraged to add any remarks or observations that you believe will help us understand your thoughts on each question.

How well does PE Networking information system ____________________ achieve the design feature:

(1) Not at All      ( 3) Slightly in Part      (5) In large part         (7) Completely

P1: Organizing Purpose
Quantity
Quality

P2: Resilient Trust
Early Exploratory Feature
Later Negotiating Feature

P3: Competitive Risk of Information Sharing
Competitor Blind Feature
Regulatory Lockout Feature

P4: Efficient Connectivity
Quantity Feature
Quality Feature

P5: Digital Proximity
Synchronous Feature
Asynchronous Feature

P6: Recommender Algorithms
Transparency: Structural Holes Feature
Transparency: Weak Ties Feature

When evaluating this site did you do so as: ( ) a member with full access         ( ) by way of a demo      ( ) observing web pages available to public

Have you ever sourced a deal using this PE Networking information system?  ( ) Yes   ( ) No
Are you a member of this PE Networking information system?  ( ) Yes   ( ) No
How often in the last year have you used this PE Networking information system?  ( ) Daily  ( ) Weekly  ( ) Monthly  ( ) 1-4 Times  ( ) Never
APPENDIX 5: EXAMPLE - EVALUATION OF WWW.AXIAL.NET

Axial Networks: Axial is designed to provide an online vehicle for sellers to “push” out to buyers new deal information. Buyers use a profile to indicate the type of deals they are interested in learning about and sellers usually “blast” the sale notice to all interested buyers. The potential buyer then indicates a desire to pursue or decline the deal. If the parties pursue the deal, they take the rest of the interaction and transaction activity off the network and conduct the transaction privately.

Observations: Historically the firm paid $12,000/year for this service and had pursued some 450 deals over five years without ever getting to an offer, a signed letter of intent to buy, or even a visit to a target deal location. The site is a one-way push of information with nearly no ability on the part of a buyer to reach back out to a seller and build a relationship. It is a real-time community of deals in the market right now (“hits the now piece”) but not a broader, longitudinal relationship building network and “they don’t really know us”. And, “there’s no sort of rating of buyers so it’s very hard to sort the good from the ugly”.

Ratings:
P4  7 – high quantity of deals; efficient in a “random guy” sort of way; deal awareness is high because we see all the deals they have that are happening in our space; 50% of the deals we see here we did not see elsewhere in our network
P4  1 – the quality of deals is so low we never chased a deal; the criteria for looking at a deal are rudimentary so we see deals we have no interest in; all the high quality deals in our space do not go online through Axial.
P5  7 – allows posting and responding to deals as participants have the time
P5  1 – no real-time connection; must take deal conversation offline
P6  2 – site allows some “Filtering” but everything is one-way; doesn’t recommend connections to others with similar deal interest; recommends only on deal type specified by firm
P6  1 – doesn’t recommend opportunistic deals or connections outside of types flagged by firm; caused us to miss near adjacent deals a few times where we didn’t specify all different types of industrial hardware for instance
P1  7 – Quantity
P1  1 – Quality: zero new deals have resulted for the firm – in part due to lack of P6 features
P2  1 – Early: really no experience pursuing and getting a deal done with anyone on the site; no real knowledge of who you are dealing with early on
P2  1 – Late: the site has no way to work a deal confidentially if we did want to pursue – must take deal process offline
P3  1 – share no confidential info over the site; no way to avoid competitors; high trust interaction occurs if two parties move a deal offline essentially
P3  1 - a broker is required to be certified by the site management to offer a deal but buyers and sellers simply join

At the end of the evaluation there was this realization that this site is not effective for us. We see many low quality deals because others, like us, do not have any trusted relationships on the site, it does not really provide any of the features of the IO SNIS model, and even if it did and we got a deal we would take it off the site anyway by their procedures.

As a consequence of this evaluation, we called Axial and indicated our unhappiness with their performance. They immediately dropped our fee and requested an opportunity to prove their utility to us. We suspect that they cannot meet our needs for high quality, proprietary deals and in fact cost us time chasing bad deals.

We do not see this site as an IO SNIS. This site would need to incorporate every proposition from the model in order to evolve into an information system we could believe would generate proprietary deals for us.
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<thead>
<tr>
<th>Network</th>
<th>Aspect of SNS</th>
<th>Year</th>
<th>Author(s)</th>
<th>Journal</th>
<th>Key Findings</th>
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<tbody>
<tr>
<td>SNS Generally</td>
<td>History &amp; Definitions</td>
<td>2008</td>
<td>Boyd, Ellison</td>
<td>&quot;Social Network Sites: Definition, History, and Scholarship&quot;</td>
<td>Discussion of diversity of Social Network Sites from a computing and information systems perspective; timeline of 43 SNS ’97–’06 launches; defines the use of “network” as connecting online users who are typically connected offline; the organizing feature of the sites is individual communication within existing extended social networks; breaks prior research of SNS into “self-presentation”, “network structures”, “bridging online and offline social networks”, and “privacy”; suggest future research on who is and who is not using SNS sites and why nationally and internationally.</td>
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<td>McLoughlin, Lee</td>
<td>&quot;Social software and participatory learning: Pedagogical choices with technology affordances in the Web 2.0 era&quot;</td>
<td>Discussion of diversity of social software from a behavioral, pedagogical perspective; defines ten types of social software categories from multi-player gaming to file sharing systems; charts 12 social teaching/learning environments employed in educational environments over two years (2005 &amp; 2006); identifies four unique advantages (uses and gratifications) of social software: connectivity and social rapport, collaboration information discovery and sharing, content creation, knowledge/information aggregation; suggests that true SNS are a combination of social software tools that give users control of “system architecture” and sharing with ubiquitous tools across the internet. Interesting approach that mirrors uses of SNS discussed later by Joinson and Perotti with a focus on user control in an environment (university education) that is often perceived a top down – informed expert to uniformed user.</td>
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<td>2011</td>
<td>Grossman, Stengel</td>
<td>&quot;2010 Person of the Year: Mark Zuckerberg&quot;</td>
<td>History of Facebook founding; key statistics of largest SNS; discussion of key features; launch successes and failures; user information security; international user participation; format for B2C media and marketing; profiling users; “connecting” and the “wisdom of friends”.</td>
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<tr>
<td>Individuals As Users (IAU) of SNS</td>
<td>Personal I2I (Individual to Individual) User Requirements</td>
<td>2008</td>
<td>Joinson</td>
<td>&quot;Looking at&quot;, 'Looking up', or 'Keeping up with' People? Motives and Uses of Facebook</td>
<td>Set of Empirical analysis of SNS users to investigate the uses of one social networking site; provides evidence of 7 uses favored by factor analysis of a convenience sample – social connection, shared identities, photographs, content (applications), social investigation, social surfing, and status updates; discussion of “uses” and “gratifications” of SNS; summary of user motivation in SNS use – emotional support, social searching, social browsing, social surveillance, and increasing social capital –with reference to works by Lampe, Ellison, Stafford, and Wellman.</td>
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<td>2004</td>
<td>Stafford, Stafford, Schkade</td>
<td>&quot;Determining Uses and Gratifications for the Internet&quot;</td>
<td>Summarizes Technology usage research streams and concludes that the U&amp;G model of consumer choice of new media is well suited to explaining the motivations related to continued and increased use of the Internet (including SNS); suggests gratification based upon &quot;media content&quot;, &quot;usage process&quot;, and/or &quot;social interaction&quot;; used FA, CFA to find these three constructs explain individual use of the internet.</td>
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<td>2006</td>
<td>Ellison, Heino, Gibbs</td>
<td>&quot;Managing Impressions Online: Self-Presentation Processes in the Online Dating Environment&quot;</td>
<td>Results from 34 interviews of online dating site users; findings provide qualitative data to suggest that individuals aspiring to intimate relationships find a balance between their &quot;authentic&quot; and &quot;ideal&quot; self-presentation online as suggested by the &quot;Social Information Processing&quot; theory in offline studies.</td>
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<td>2008</td>
<td>Ellison, Lampe, Steinfeld</td>
<td>Future Possibilities&quot; Interactions, Michigan State University</td>
<td>Survey data and interviews on changing use of prominent SNS over three period with university students as sample – reported uses remained constant over time; number of friends per user grew by 65% while time spent on SNS grew by 200%; primary uses are &quot;find, meet, check out, learn about, keep in touch&quot; with other people.</td>
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<td>2009</td>
<td>Skeels, Grudin</td>
<td>&quot;When Networks Cross Boundaries: A case study of workplace use of Facebook and LinkedIn&quot;</td>
<td>Conducted qualitative research that suggests SNS are used by employees for work and social uses and distinct boundaries exist between professional SNS and personal SNS – including separate &quot;personas&quot; for the same individual on two different SNS; the Authors conducted a convenience survey of 430 Microsoft employees from a randomly chosen invited sample of 1,000 of the 88,000 worldwide employees; further conducted 30 semi-structured interviews; surveys identified uses of LinkedIn and Facebook while in the workplace – predominantly self-presentation, staying connected, and looking-up others – similar to Joinson and Lampe; observed LinkedIn profiles as static versus Facebook as much more dynamic; purpose of LinkedIn is connected to future employment opportunities versus Facebook for current and future interpersonal opportunities; identified &quot;key tensions&quot; of SNS in workplace: productivity &quot;killer&quot;, mixing professional and personal personas, crossing hierarchy, status and power boundaries, internal and external confidential information disclosure (intentional &amp; unintentional informant); authors suggest SNS use in employers workplace is inevitable and must be designed for in future research (referenced IBM Beehive).</td>
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<td>2010</td>
<td>Wu, DiMicco, Millen</td>
<td>&quot;Detecting Professional versus Personal Closeness Using an Enterprise Social Network Site&quot;</td>
<td>Discussion of multiplex relationships as combination of strength of tie and professional v. personal closeness in the workplace (2x2 Framework); studied the IBM SNS called Beehive with 60,000 employees and 400,000 connections; attempted to understand relationship strength based upon measurement of their online interaction; 196 non-random high activity users were selected; stepwise regression narrowed to 17 factors of use that potentially predicted closeness; identified the factors that uniquely predict professional v. personal closeness relative to strong and weak tie strength (Table 5).</td>
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<td>2010</td>
<td>Forrester Consulting</td>
<td>&quot;Social Networking in the Enterprise: Benefits and Inhibitors&quot;</td>
<td>Authors complete 262 surveys as a convenience sample of a randomly polled population of IT or business decision-makers responsible for technology selection and collaboration in companies of 500 or more employees; demographics of</td>
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exists of a similar study of intra-enterprise adoption of SNS conducted by Neil Hair (Rochester Institute of Technology) that concluded in part: 1)social media tools are proliferating in the 97 organizations that responded to the survey, and 2)most companies possessed no governance policy or protection of sensitive information and global reach of social networks. Respondents 60/40 US/EU, 54% >4,999 employees and 15% 500-999 employees; identified perceived value add of SNS in the enterprise: after marketing to consumers leaders perceive enterprise B2E SNS as a set of tools for enabling greater employee engagement – often at a lower anticipated cost than current non-SNS techniques; identified 11 concerns of sample participants to SNS deployment in the workplace – 6 related to information control, 3 related to integration, training and support of existing information systems infrastructure (Table 6); authors recommend “chart a course that taps the SNS benefits and mitigates the risk” but aside from 4 generic cases offer no definitive guidelines to develop or design the SNS for intra-enterprise deployment.

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<th>Year</th>
<th>Authors</th>
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<tr>
<td>2009</td>
<td>Brzozowski, Snadhholm, Hogg</td>
<td>Effects of Feedback and Peer Pressure on Contributions to Enterprise Social Media</td>
<td>Authors conducted year-long study with open access to HP’s internal, firewalled social media tools; time series analysis of users “contributions” measured by hidden and non-hidden clicks, comments, and original posts by business unit and supervisory relationship; not a full blown SNS; two primary results of the analysis: 1)social media tool participation by one’s direct supervisor significantly influenced employee to become active, and 2)an active “contributor” is more likely to remain active if they receive direct feedback on who and how many other employees click and comment on their work; authors suggest further study of linear and non-linear connection of leaders to employees, modifying SNS design with input above and measuring total SNS performance on quality and quantity of content increase, and intervention experiments to measure effect on use of SNS.</td>
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<td>2009</td>
<td>Brzozowski</td>
<td>“Watercooler: Exploring an Organization Through Enterprise Social Media”</td>
<td>The authors hypothesize that as organization scale increases the collective expertise and knowledge grows but tapping that wisdom typically becomes more difficult unless a ubiquitous, “safe”, time and space scale free information system (an enterprise SNS for example) create opportunities for SWT weak tie connections; the authors designed the internal SNS “Watercooler” based on RS feeds; they describe their design principles; 6% of users after one year voluntarily participated in an online survey; authors supplemented survey responses with blog comments and clicks as proxies for “readership” and “collaboration”; the principle uses and gratification were consistent with Joinson and Perotti plus a key barrier to adoption is perceived “corporate” systems support and key motivator in this setting was “supervisor” example setting. Interestingly participating employees perceived they already had the skills to participate in the SNS based upon non-work experience with SNS.</td>
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<td>Additional examples of enterprise SNS experiments are available in a number of case studies including: Innovation Café blogging at NEC (2007 NEC Technical Journal) and Cognizant 2.0 blog and “Cweets” at media consulting firm Cognizant (May 23, 2001 Fortune).</td>
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<td>B2C (Business to Consumer) User Requirements</td>
<td>Fundamentally a marketing domain with significant experiential research occurring as SNS adopt traditional</td>
<td>Not studied in detail for this literature review but an important observation is that the market value of SNS providing companies is most directly linked to growth in unique visitors, time spent, and advertising revenues received. And, numerous articles in business and technology newspapers and magazines suggest that the user profile data itself is fast becoming one of the most valuable assets of SNS firms from Facebook to Google to</td>
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<td>Organizations As Users (OAU) of SNS</td>
<td>B2B (Business to Business) User Requirements</td>
<td>SNS System Design</td>
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<td>O2O (Organization to Organization) User Requirements</td>
<td>Fundamentally a Supply Chain domain founded in information systems typified by EDI (electronic data interchange) for ordering and forecasting between OEM and Tier1/2 suppliers, VMI (vendor managed inventory) for automated resupply of parts and components managed by vendors, and CRM (customer relationship management) systems.</td>
<td>Numerous articles in the domain exist to describe the nature, measurement, effectiveness, value, and adoption of these systems dating back to the mid-1980s. The value of these systems varies by application and supply chain network but is founded in lower total cost and/or revenue growth – typically governed by agency with enforceable contracts and activities readily measured by financial systems within organizations. A key observation for each of these B2B systems is that they tend to be unidirectional, transactional, contractual, and traditional linear communication systems and as such do not manifest the fundamental (and less measureable) collaborative, multiplex relationships of SNS connecting multiple suppliers and customers seamlessly across geographies and time.</td>
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<td>Existing Research Gap</td>
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<td>Attempts to connect individual behaviors to specific features in SNS; used Yoo’s call for research based upon Experiential Computing; conducted 86 qualitative interviews on SNS features valued by a convenience sample college students with experience using 14 SNS sites; researchers clustered responses into 7 valued activities: keeping in touch, organizing personal and contact information, sharing personal information, finding people, presenting self-image, enjoying entertainment media, and getting to know others; results essentially repeat Joinson’s findings for SNS with Individuals as Users; researchers conclude that SNS sites that are designed to best support these features will have a higher probability of success; however, they do not provide any evidence of correlation between these design features and the relative success of sites.</td>
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**Marketing tools to the unique user experience inherent in SNS.**

TomTom (WSJ 2001). Or maybe it’s all just another Tech Valuation Bubble 2.0 (Fortune, July 2011)
<table>
<thead>
<tr>
<th>Year</th>
<th>Authors</th>
<th>Title</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>Hevner, Linger, Sobel, Walton</td>
<td>&quot;The Flow-Service-Quality Framework: unified engineering for large-scale, adaptive systems&quot;</td>
<td>For the purpose of our discussion of SNS – the authors suggest that modern large scale information systems involve complex system of systems integration; size and complexity is a function of the adaptive nature of this integration – not necessarily the lines of codes, objects, etc.; FSQ engineering is needed to create adaptive, iterative, robust systems development work flows precisely because behaviors of systems, artifacts, and actors &quot;cannot always be known or predicted&quot;; suggests an explanatory power for SNS development and might suggest a test of FSQ on one or more SNS.</td>
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<td>2010</td>
<td>Yoo</td>
<td>&quot;Computing in Everyday Life: A call for research on experiential computing&quot;</td>
<td>Author’s attempt to combine behavioral and design sciences to explain user-computing interaction today; &quot;everyday artifacts have embedded computing capabilities&quot;; computing is no longer separated from users by space, time, actors or even hard or soft artifacts; implies the gps, smartphone, or SNS as a seamless extension of the user; also suggests that practice/experience will drive construction, evaluation, evolution and destruction of many current and new computing systems; IS community can facility – in large part by considering &quot;what is not there&quot;. (SNS with OAU?)</td>
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<td>2011</td>
<td>Hempele</td>
<td>&quot;Trouble@ Twitter&quot;</td>
<td>History and summary of creation and evolution of Twitter as an SNS; principal research interest is that the software artifact was created to allow users to answer one question: &quot;What are you doing now?&quot;; the creation of the SNS happened after the artifact creators, &quot;unsure of what they’d created, turned Twitter over to its users&quot;; users then &quot;created&quot; its key features: unintuitive language, hashtags, retweets, dashboards to organize user’s &quot;twittering&quot;; 25% of users generate 90% of worldwide tweets; author suggests SNS performance is falling with users spending 10% less time on site from prior year and almost half of account holders inactive; is it a leadership issue or an artifact design/robustness issue or no real performance issue at all?</td>
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<td>2008</td>
<td>Bouman, Hoogenboom, Jansen, Schoondorp, De Bruin, Huizing</td>
<td>&quot;The Realm of Sociality: Notes on the Design of Social Software&quot;</td>
<td>Defines sociality per Fiske 1998 as &quot;how actors organize their social practices and construe their identities&quot;; the authors suggest four stages of sociality based upon their observation of social site computing experience (justification is Rose’s “Soft Systems Approach” 1997): network-centered (personal network), community-centered (common organizing purpose), object-centered (device specific i.e.: smartphone), system-centered (SNS); the authors describe a conceptual model mapping four areas of SNS development – enabling practice, mimicking reality, building identity, actualizing self; they discuss the “designer’s dilemma”: augmenting social practice through the most advanced digital, virtual, software and hardware artifacts while averting alienation when a system fails to &quot;resemble the daily routines, language and practices&quot; of the users of SNS; see Sociality Software Design Framework – Table 4. Authors suggest the Framework can be used to illuminate differences between Linkedin (a market that connects resumes to hiring opportunities) and Friendster (peer rating &amp; self-presentation)</td>
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<td>International Conference on System Sciences</td>
<td>developers of SNS design artifacts and components to meet these needs; they then modify the Fit Appropriation Model from this experiential computing research. No test of SNS success or performance relative to these “social” design principles is discussed.</td>
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<tr>
<td>2009</td>
<td>Young, Quan-HaSe</td>
<td>“Information Revelation and Internet Privacy Concerns on Social Network Sites: A case study of Facebook” Proceedings of C&amp;T’09 ACM Authors interviewed a convenience sample of 19 university students (Canada) while the students were logged into their Facebook profile; questions targeted disclosure settings, profile accuracy, and privacy practices of the users; significant findings show 1) larger social network users were more likely to reveal information, 2) concern for unwanted sharing showed no association to actual user privacy settings employed, 3) frequency of use was not shown to be associated with information revealed, 4) stated concern for privacy was correlated with less information visibility and a model of the significant factors explained about 35% of the variation in privacy settings observed. OLS regression used.</td>
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<td>2007</td>
<td>Dwyer, Hiltz, PaSerini</td>
<td>“Trust and Privacy Concern within social networking sites: a comparison of Facebook and MySpace” Proceedings of AMCIS 2007 Association for Information Systems Authors broaden Acquisti et al research to include users of the larger body of Facebook and MySpace SNS; asked two fundamental questions: importance of privacy for disclosure of personal information and level of inherent trust in a given SNS to protect one’s information; 48 MySpace and 69 Facebook users as convenience sample responding to online survey; included 45% and 16% non-university affiliated users; significant results were found for users feeling that Facebook personal information was safer than similar information on MySpace. MySpace profiles were perceived to be more “exaggerated” – less trustworthy, no significant perceived difference in privacy settings available to users between the two SNS but Facebook users tended to reveal more “real” information. The authors were confused by the correlation of higher site trust with more information disclosure while a less trustworthy site possessed larger new development relationship. The confusion was most likely due to data taken in 2006 while MySpace was perceived to be growing more effectively than Facebook – a situation that has since reversed completely. ANOVA used.</td>
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<td>2006</td>
<td>Acquisti, Gross</td>
<td>“Imagined Communities: awareness, information sharing, and privacy on the Facebook” PET 2006 294 convenience sample (209 with FB profile, 81 with no profile, 8 with deactivated FB profile); all were members of the authors’ university; key findings included: non-members of the SNS had significantly higher importance on privacy but no other statistically difference between groups found in any other category, actual SNS membership was uncorrelated to level of privacy concern, FB profile information tended to be accurate and complete (86% provide information such as birthdate, email, phone, real name), and stated concern for privacy was uncorrelated to higher privacy settings in the SNS; about 1 in 4 users did not know how to adjust privacy settings and are equally unaware of the visibility of their existing profile to others in the SNS; FB users trusted the site significantly more than similar users trusted MySpace or Friendsster; finally researchers were able to use a web crawler to compare user responses to actual online behavior before and after the survey finding that 77.8% gave answers on profile settings that were exactly accurate.</td>
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<td>2008</td>
<td>Gilbert, Karahalios, Sandvig</td>
<td>“The Network in the Garden: An Empirical analysis of social media in rural life” CHI2008 ACM Study of SNS behavior of 1661 rural and 1721 urban users; found that online behavior was similarly differ between these two groups as there offline behavior would have anticipated: found rural users 1 friend to every 3 urban users friends, unique commenters, and reciprocal relationships; rural women set profiles to higher security levels than urban women, rural men and urban men; rural friendships are significantly weaker as distance increases – with fewer strong and weak ties as distance grows even though urban users tend to be more concentrated geographically. Very useful to this SNS discussion as empirical evidence of online SNS reflecting offline social behavior of individuals.</td>
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| 2007 | Ahn, Han, Kwak, Moon, Jeong | “Analysis of Topological Characteristics of Huge Online Social Networking Services” WWW2007 ACM Conducted analysis given complete access to Cyworld data – able to “crawl” the data and measure network topologies of “friends”; observed the power law relationship online – more active users are more likely to have more friends and transitive linking favors their addition of even more friends; number of nodes and average path length are shown to have peaked at about 16 and 9 respectively; and the authors suggest that online network size is consistent with Dunbar’s assertion that mean human social community size at 147.8 (1993 Brain & Brain Sciences, 16(4):681-735) finding the size of SNS friend network
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<th>Year</th>
<th>Authors</th>
<th>Paper Title and Details</th>
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<td>2008</td>
<td>Nazir, Raza, Chuah</td>
<td>&quot;Unveiling Facebook: a Measurement study of social network based applications&quot; IMC'08 ACM Novel approach where authors launched three applications in the SNS Facebook and measured network node characteristics; findings included: application participation mirrored friendship network and a small number of users accounted for majority of application use (consistent with power law distribution) and, as anticipated with the nature of online SNS, even with high clustering of individual user groups the overall users of the applications were members of independently diverse geographical locations and scalability was limited only by server data capacities in real-time.</td>
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<td>2007</td>
<td>Mislove, Marcon, Gummadi, Druschel, Bhattacharjee</td>
<td>&quot;Measurement and Analysis of Online Social Networks&quot; ICM'07 ACM The authors see SNS as organized around users and not content, therefore, SNS should behave like offline human networks; SNS users by definition and the grace of the software link themselves to other users (unlike content sites that link to other content sites). The authors &quot;crawled&quot; publicly accessible online SNS (Flickr, LiveJournal, Orkut, YouTube); to obtain a non-biased sample of nodes they &quot;crawled&quot; 11.3 million users with 328 million links; they summarize: SNS nodes and links follow a power law, small world, scale free relationship where users at the core connect through a large number of short paths and uses on the fringe are less social and less &quot;trusted&quot;, &quot;the social aspect of these network systems is self-reinforcing – one must make friends to be trusted&quot;; they note that SNS have much higher fractions of symmetric links and local clustering than any other Web &quot;network&quot; structure – sites and page linkage for example. They also suggest a benefit to developers and viruses alike if they target the most influential nodes in any given SNS.</td>
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<td>2011</td>
<td>Borgatti, Halgin</td>
<td>&quot;On Network Theory&quot; Organization Science A seminal work on the work of Granovetter (Strength of Weak Ties – SWT) and Burt (Structural Holes Theory – SH) underpinned by the network Flow Model conceptually. They then suggest the Bond Model as an alternative means of understanding networks not so much as flows of information, capital, and power but networks of nodes intent on transferring capabilities to (I argue they may in fact mean sharing with) other nodes to create a collaborative outcome that is greater than the sum of the parts. In either case they argue that network theory is designed to either favor Choice (behaviors, attitudes, beliefs) or Success (performance rewards). And they suggest that a 2x2 matrix should be used by researchers to clearly understand node attributes and context relative to network function to gain capital or homogeneity (I suggest collaboration) through Flow or Bonds.</td>
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<td>2009</td>
<td>Barabasi</td>
<td>Scale-Free Networks: A Decade and Beyond Science The author sites his 1999 seminal work and reemphasizes the breadth of literature across multiple disciplines from proteins to social networks that reprove the theory that interconnectivity is fundamental to the behavior of complex systems; no networks in nature or technology are completely random; the legacy of the scale-free property of certain networks is that the network structure and its evolution are inseparable; he emphasizes that predicting behavior of the network starts with a data driven understanding of the many &quot;dynamical phenomena &quot; underpinning complex nodal interactions (reminds me of Feynman’s fractal theory).</td>
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| 1995 | Provan, Milvard | "A preliminary theory of inter-organizational effectiveness: a comparative study of four mental health systems" ASQ The authors provide empirical evidence from 265 surveys of participants (patients, family, case managers) in four heterogeneous health systems to suggest that, in health systems, effectiveness of the network is improved when: 1) The network is integrated through a centralized control structure, and, 2) When mechanisms of external control are direct Mitigated by the importance of stability and adequate funding for maintaining the effectiveness of the network over time. Beyond the challenge of measuring effectiveness through the proxy of participants’ perceptions of patient care in a chronic illness environment, this study also is constrained by the nature of the healthcare systems studied. Specifically, these health
systems represented a structure of organizations that we not necessarily competitive to each other. There might be some overlap of services and the organizations might or not cooperate on any given patients behalf, but in theory they had that same goal. Example of network measurement based upon survey of participants’ perception of effectiveness.

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<td>1997</td>
<td>Walker, Kogut, Shan</td>
<td>“Social capital, structural holes and the formation of an industry network”</td>
<td>Organization Science</td>
<td>The authors measured structural equivalence (firm has relationships with the same other firms in the network) among startup and partner biotech firms to determine how and if “social capital” or “structural holes” tended to explain network formation. They suggest that the formation of any business to business network is a function of the interplay between desire of agents (entrepreneurs in their example) to cooperate with (per Bourdieu &amp; Coleman) or exploit holes between (per Burt) members of the existing network. Good discussion of social capital starting with dense networks of completely connected firms – each with every other – as a “closed” network with equal access to established norms of behavior and inter-firm information flows and deviant behavior sanctioning – social capital (because as predictability of behavior increases self-seeking opportunism is constrained). Since networks are never completely closed or open, there tends to be firms that are more and less connected – and firms with less connectivity should be more vulnerable to opportunistic behavior. Burt suggests that the conformity of closed networks generally limits the entrepreneur unless the firm can spot the relatively sparse gaps in the structure that are opportune and can be exploited. The authors argue that the two can be compared by identifying the number of new contacts a firm makes in a period – more contacts should increase social capital (strengthen the firm) or lower its access to structural holes (weaken the firm). Measurement: “examine the dispersion of inter group densities around the network average” and the number of established firms entering a network each period v. new startups v. cooperative relations formed. Finding: social capital theory better predictor of behavior in network over time suggesting that more constrained firms grow more partners and positively determine network formation and industry growth.</td>
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<td>2000</td>
<td>Wilkinson, Young</td>
<td>“On cooperating: firms, relations and networks”</td>
<td>Journal of Business Research</td>
<td>Argues that modern business networks are not “controlled” by one or more firms exerting direct influence but in fact participation, learning, and adaptation are the only strategy to succeeding in inter-business networks where a firm has little control over others in the network but still seeks to use the network to their advantage. Relationship portfolio (Turnbull 1996) relations with actual and potential suppliers, customers and distributors, regulators, governments, competitors, and “complimentors”. Network position – emergent, self-organizing, relative to other firms in network and number and type of connections. Many innovations originate on the fringe of the network with weakly connected firms. Very closed networks risk stagnation and/or corruption of a few power firms corrupting the entire network. Importance of cooperative behavior: total cost, regulatory efficiency, fair and level field, optimal coordination of resources on new products, testing, marketing, capital, and capacity. Network of firms – measures: density, multiplicity, and reciprocity of relations (Achrol 1997).</td>
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<td>2001</td>
<td>HakanSon, Ford</td>
<td>“How should companies interact in business networks?”</td>
<td>Journal of Business Research</td>
<td>Interesting in that it clearly discusses three paradoxes of inter-organizational networks: 1) Nodes are connected by threads (flows) that are built by investments by two parties thus connected – the greater the investments the greater the content (power) – stronger nodes = greater content but also greater dependence and less flexibility (to act purely in self-interest for example) over time. 2) Network is way to influence and to be influenced. Purely egocentric behavior leads to network weakness – fewer connections. Consequently, “listening, reflecting and reacting to other (firms) become central activities”. 3) As each organization tries to gain greater control and influence the network to focus on their aims to the exclusion of all others they risk becoming singularly centric and unidirectional and thus more likely to encounter long-term problems (per Wilkinson) – especially inflexibility in integrating</td>
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| 2007 | Provan, Fish,   | "Inter-organizational networks at the network level: a review of the  | Complete literature review on whole networks (inter-organizational) over past twenty years. Suggesting future directions of research for this "understudied" topic:  
|      | Sydow           | empirical literature on whole networks"                              | 1) Given the dearth of empirical study of whole networks – conduct empirical research.  
|      |                 | Journal of Management                                                | 2) Relationship of various whole network structures to effectiveness.  
|      |                 |                                                                      | 3) Definition and effect of various forms of network governance, development, and outcomes.                                                                                                          |
|      |                 |                                                                      | Challenges: studying multiple whole networks over several years, identifying boundaries of whole networks, defining measures of qualitative and quantitative of network structure, content, founding, evolution, entrants and exists.  
|      |                 |                                                                      | They also suggest that insights gained from study of individuals and networks and/or egocentric organizations and networks might be readily adapted to study of whole networks. |
|      |                 |                                                                      | Article provides detailed definition of networks and considers IV of single or multiple actors and DV of one organizations or whole network outcomes (2x2 matrix).        |
APPENDIX 7: IRB DETERMINATION LETTER

January 25, 2013

Matthew Mullarkey, M.B.A.
Information Systems & Decision Sciences
4202 E. Fowler Ave., CIS 1040
Tampa, FL

RE: Expedited Approval for Initial Review
IRB#: Pro00010017
Title: Design Principles for Inter-organizational Social Network Software Systems (IO SNSS)

Dear Mr. Mullarkey:

On 1/25/2013 the Institutional Review Board (IRB) reviewed and APPROVED the above referenced protocol. Please note that your approval for this study will expire on 1/25/2014.

Approved Items:
Protocol Document:
Design Principles for IO SNSS

Consent Document:
Informed Consent IO SNSS.pdf

Please use only the official IRB-stamped consent document(s) found under the "Attachment Tab" in the recruitment of participants. Please note that these documents are only valid during the approval period indicated on the stamped document.

It was the determination of the IRB that your study qualified for expedited review which includes activities that (1) present no more than minimal risk to human subjects, and (2) involve only procedures listed in one or more of the categories outlined below. The IRB may review research through the expedited review procedure authorized by 45 CFR 46.110 and 21 CFR 56.110. The research proposed in this study is categorized under the following expedited review categories:

(6) Collection of data from voice, video, digital, or image recordings made for research purposes.
(7) Research on individual or group characteristics or behavior (including, but not limited to,
research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

As the principal investigator of this study, it is your responsibility to conduct this study in accordance with IRB policies and procedures and as approved by the IRB. Any changes to the approved research must be submitted to the IRB for review and approval by an amendment.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

John A. Schinka, Ph.D., Chairperson
USF Institutional Review Board