

Work Design in Knowledge- Based Network Organizations: Facilitating Supply Chain Knowledge Flows via Network Entrepreneurship

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Abstract

We introduce social network theory as a way of understanding work design, which can facilitate knowledge flows in knowledge based network organizations (e.g. supply chain network). We introduce a typology of “work design network” to view work design as a strategic option of creating and recreating knowledge network; then we discuss what type of work design can facilitate more network entrepreneurial activities so that the resulting work networks can be more agile, adaptable and easy to achieve collective alignment.

1. Introduction

With the rise of increasingly global and knowledge-intensive economy, the practice of work has been changing dramatically. Work is increasingly knowledge intensive and geographically dispersed (Sinha and Van de Ven 2005). Knowledge intensive services have become the dominant form of work in the industrialized world. Quinn et al. (1997) report that “three-fourths of all economic activities are based on managing intellectual activities and the interface to their service outputs” (pg.288-289). This knowledge-based work often develops in several locations simultaneously and cuts across the boundaries of firms, industries and nations.

Work activities, undertaken to develop, produce and deliver a product, have become globally distributed in value chain networks where individuals and organizations from different cultures bring divergent bodies of knowledge and practices whose integration yields new capabilities (Baba et al. 2004). As a result, competition takes place not only among individual firms, but among “spider webs” of organizations, which are competing work design networks consisting of firms that have specialized knowledge and are geographically dispersed yet need to interact often and in depth. Work design, a system of arrangements and procedures for doing work, is no longer contained within a job or

even an organization; it often transcends the boundaries of organizations, professions, and countries. It is dynamic knowledge- based work that strives to design network arrangements that help knowledge-based organizations facilitate work system supporting knowledge flows. Such knowledge flows enable organizations to establish or maintain prosperity in competitive environment.

Consistent with its practical relevance, there has arising a burgeoning interest among scholars in reconceptualizing work design in today’s knowledge intensive economy. Scholars have been called to return to the frontier of organization science by reopening the study of work design (Sinha and Van de Ven 2005; Barley and Kunda 2001). Sinha and Van de Ven (2005) propose a framework for studying work design. There also exist studies addressing new work design issues in today’s knowledge intensive economy in an implicit way. For example, some scholars address work design issues by focusing on how to coordinate product design, process design and supply chain design—three major design activities in work design. Some researchers extend the supply management research domain to include issues relevant to work design.

However, these discussions are generally scattered and disorganized. A systematic examination of the relationship between work design and PAIR benefits is needed. Second, these studies don’t consider the achievement of sustained PAIR benefits, which determines whether an organization has sustained competitive advantages in a volatile environment. Third, these studies consider work design as specific job practices or some concrete execution rather than collaborative efforts distributed across a network, thus failing to reflect that today’s work design, a type of a work can also be organized through a network, a work design network. Similar to other collaborative work, work design conducted by a network is also concerned with such issues as alignment with network mission/strategy, participant recruiting and termination, participants’ roles, relationships,

work regulations within the network, technological infrastructure, participant learning, network learning, and design renewal. In order to cultivate evolving work designs that are responsive to dynamic environing circumstances, the work system in a work design network by its continuous activities should be productive, agile, innovative and reputable so that dynamic capabilities can be created for organizations to do better in a volatile environment.

In contrast, we take a different perspective by viewing work design at a strategic level, as a means to enhance key outcomes that drive firm performance. This strategic view elevates work design from a function that supports strategy to a key element of strategy. It emphasizes matching work design to the changing nature of work, particularly on the changes in inter-organizational working relationships that aim to optimize the utility of knowledge assets across (i.e. provided by) participants in work networks.

To reflect that work design is a function of relationships involving network actors from within and across organizational boundaries, we introduce the concept of work design network, which is comprised of multiple participants who collaborate in the interest of discovering and improving work design at a strategic level. In particular, we contribute to work design research by providing conceptual clarity and focus on this new lens by bringing in theory and methods from organization science, operation management and social network research to help us understand strategic work design in knowledge based organizations.

Our primary vehicle for doing this is the introduction of a typology of “work design networks”. We describe how different work design network provides different mechanisms to facilitate the process of network entrepreneurship, which refers to the continuous network change of dissolution with old partners and reformation with new ones so that a high level of agility, adaptability and alignment in work networks can be achieved.

We begin with a brief review of work design to date and with a consideration of the current knowledge economy context in which work design occurs.

2. Reconceptualizing work design: a network entrepreneurial perspective

2.1 A Traditional Perspective on Work Design

Traditionally, work design has been viewed as organization design—a system of arrangements and procedures for organizing work within and across organizations. This view is clearly reflected in how scholars distinguish work design from job design. Trist (1981, p.42) pointed out that the “redesigning of work leads beyond individual jobs to the organizations of groups of workers and beyond that to the organization of support services”.

Table 1: Work Design Issues

| | | | |
|--------|-------------|---------|-----------|
| | Work Design | | |
| Org. | Develop | Produce | Deliverer |
| Theory | Structure | | |
| | Coordinate | | |
| | Control | | |

Sinha and Van de Ven (2005) view work as “a set of activities that are undertaken to develop, produce and deliver a product—that is, a physical and/or information good and service”. We take this to mean that either goods or services have physical or information aspects. This definition indicates that work design requires of 3 sets of design activities: product design activities (develop), manufacturing process design activities (produce) and supply chain design activities (delivery). Structure, coordination and control are major issues addressed by organization theories (Daft 1989; Gerwin 1984; Gibson et al., 1997; Price and Mueller 1986; Walsh and Dewar 1987). Thus Table 1 indicates that it is naturally for researchers doing work design related studies to investigate on how these 3 sets of design activities can be structured, coordinated and controlled so that better work performance can be achieved (e.g. Sinha and Van de Ven 2005).

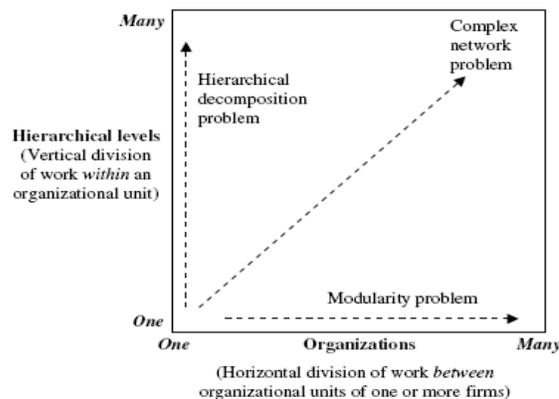


Figure 1: Work Design Within and Between Organizations

Typically, work design activities in a work system are structured along two dimensions:

vertical and horizontal as shown in Figure 1. Sinha and Van de Ven (2005) illustrate that a work system may be arranged among many hierarchical levels within an organization, which is called vertical division of work within an organization; or the work system may be distributed across many organizations, which is called horizontal division of work between organizations. This perspective views a work design network as being produced by the interactions of vertical and horizontal division of work.

This perspective parallels the value chain view (Porter 1990): the sequence of productive (i.e. value-added) activities leading to and supporting end-use (e.g. Sturgeon 2000). However, as we shall see later, this conception of “straight sequence” of activity is very limited from a work design point of view.

There are two sets of activities in value chain: primary and secondary. As shown in Figure 2, the primary activities of a value chain can also be organized as two portions: vertical and horizontal. The vertical portion includes marketing, engineering, manufacturing and field services, while the horizontal portion represents the logistics system, encompassing inbound logistics, manufacturing and outbound logistics.

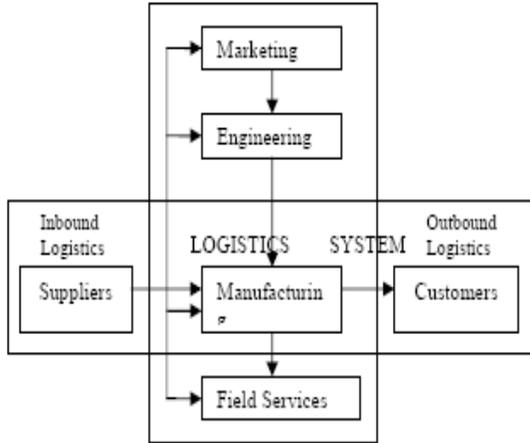


Figure 2: The value chain of a manufacturing firm (Cook et al. 1995)

In the vertical structure, hierarchical authority serves as the basic organizing principle for coordinating and controlling work across levels within an organization. In the horizontal structure, the coordination mechanism is determined by the nature of relationships among organizations. For instance, price is the coordination mechanism for an arm's length relationship and trust is the mechanism for an alliance or partnership.

Specific research studies using the value chain perspective tend to focus either on vertical structure or on horizontal structure. These studies share a common underlying assumption that work design involves a sequential chain in the following serial order: product design first, process design second and supply chain design last. This type of work design concept is represented by the left branch under the vertical category in Figure 3.

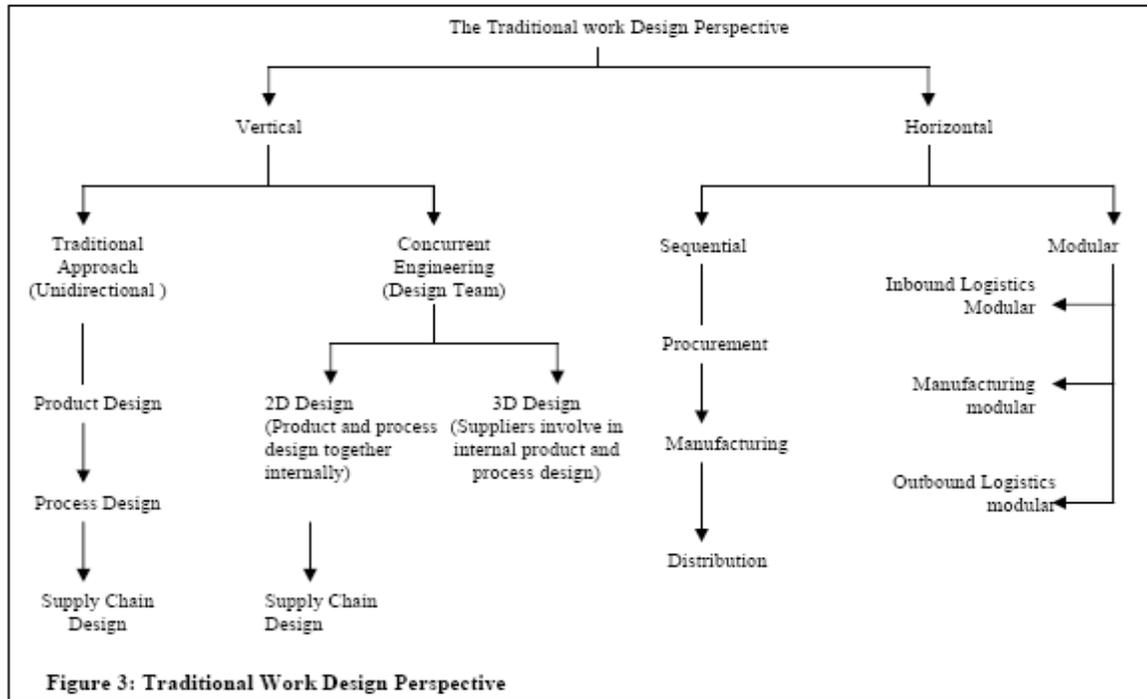
In the past 20 years, as firms become leaner and more focused on their competencies and outsourcing the rest, relational contracts, strategic alliances and value chain networks are increasingly becoming the organizational form for doing work that used to be produced within vertically integrated organizations. Reflecting this shift in organization design from fit between functional areas to an examination of the interdependencies between various work subsystems across organizational boundaries (Siggelkow and Levinthal 2003), two research streams have arisen. In one stream, scholars take a “hierarchical decomposition” approach as shown by the right branch under the vertical category in Figure 3, focusing on how nonhierarchical methods coordinate work design activities that are distributed within and between organizations (Levinthal and Warglien 1999, Fine 2005). There are two main approaches to this: 2D concurrent engineering (design product and process simultaneously) and 3D design (involve suppliers in product and process design).

In the second stream of work design, researchers have tried to expand the concept of supply chain management, which has become so broad to encompass product design and process design as components of supply chain management. From this expanded view, supply chain design becomes the synonym of work design. Similar to the evolution of the work design focusing on issues in a vertical structure, the supply chain management research also has experienced a shift from a serial view (as shown by the left branch under the horizontal category in Figure 3) to a non serial modular approach (as shown by the right branch under the horizontal category in Figure 3).

Conceptualization of work design has evolved from considering the sequence of the relationships among the three sets of design activities to explore a configuration of relationships occurring simultaneously and reflecting the drastic changes in work practices.

We refer this evolution as traditional work design, because it still doesn't fully capture the nature of work and work design in the modern

knowledge-based business environment. The next section examines the emerging non-traditional aspects of work design.



2.2 Re-conceptualize Work Design in Knowledge-intensive Economy

Traditionally, work design for organizations in 20th century was not particularly dynamic. However, with the rise of knowledge intensive and geographically dispersed work, there are signs that work design has become more dynamic (e.g. Sinha and Van de Ven 2005). A main contention in these studies is that organizations need to increasingly pay attention to dynamic work design. A corollary to them is that we need to better understand the nature of work design dynamics, as well as how to implement them. In this new environment, work design needs to be dynamic, because the knowledge on which work is based changes quickly and makes “today’s certainties always become tomorrow’s absurdities” (Drucker 1995, pg.77). As a result, the modern organization tends to destabilize itself (Drucker 1992). It must be organized for innovation. Innovation, as the great Austro-American economist Joseph Schumpeter said, is “creative destruction.” Work must be organized for the systematic abandonment of whatever is established, customary, familiar and comfortable

--whether that is a product, services or process; a set of skills; human or social relationships; or the organization itself (Drucker 1992). In short, work must be designed for agility, adaptability and collaborative alignment. Adapting Lee (2004)’s definition, we refer agility as the network organization’s ability to react quickly to unexpected or rapid shift in supply and demand. Adaptability refers to the network organization’s ability to adjust work system design to meet structural shifts in markets and modify work design network to strategies, products and technologies. Collective alignment refers to ensuring that the interests of all participants in work design are consistent.

In contrast, we take a different perspective by *viewing work design at a strategic level*, a means to enhance key outcomes that drive firm performance. This strategic view elevates work design from a function that supports strategy to a key element of strategy. It emphasizes matching work design to the changing nature of work.

This strategic perspective of work design focuses on the changes in inter-organizational relationships. We take the position that work design is concerned with creating and repeatedly re-creating networks of relationships for two

major reasons. First, in today's knowledge intensive economy, work design is a function of relationships involving network actors from within and across organizational boundaries. Second, it has been recognized in a growing body

of research that changes (i.e. entry into or exit from) in interorganizational relationships are critical strategic options for work design related issues, such as new product development and supply chain design. This leads us to introduce a

Table 2: A Comparison of Network Entrepreneurship Oriented Work Design and Traditional Work Design

| Issues | Network Entrepreneurship Oriented Work Design | Traditional Work Design |
|---------------------------------|--|--|
| View of Work Design | Work design is a strategic weapon | Work design is an operational level design |
| Agility (cognition) | Strong ability to discover and be responsive to changes | Modest ability to respond to Changes |
| Adaptability (structure) | Easiness to reshape network | Hard to reshape network |
| Alignment (affect) | Interests of participants is developed to be synergistic | Participants forced to choose between own and network's interests |
| Competitive priorities | Emphasize a combination of speed, quality, cost and flexibility to achieve total value | Emphasize one of the four competitive priorities: speed, quality, cost and flexibility |

concept of a work-design network. Doing so is consistent with the common practice in social network research, which focuses on specific types of networks, such as "friendship network" or "advice network" (Brass 1984; Krackhardt 1990). However, the concept of a "work- design network" has not been examined in social network research.

We consider a work design network to be comprised of multiple participants who collaborate in the interest of discovering and improving work design at a strategic level. Our contention is that the strategic work design network provides mechanisms to facilitate the process of network entrepreneurship, which refers to the continuous network change of dissolution with old partners and reformation with new ones so that a high level of agility, adaptability and alignment can be achieved. Next, we consider this network- entrepreneurship-oriented approach to work design and explain how it differs from traditional work design.

2.3 Network-Entrepreneurship-Oriented Work Design

Agility, adaptability and collective alignment are the three attributes of a work system that can be used to understand its effectiveness. To be agile, both the alertness to discover unexpected or rapid shifts in supply and demand and the ability to react quickly to changes are important. Either alertness or ability to respond alone is not sufficient to be agile. To be adaptable, the willingness and the ability to reshape a work design network according to the market structure shift is necessary. To achieve alignment, trust is needed to function as the governance mechanism. A work- design that aims to achieve a high level

of agility, adaptability and alignment is referred to as having a network- entrepreneurship orientation.

As shown in Table 2, a network-entrepreneurship- oriented approach to work design is distinguished from traditional approach with respect to issues of agility, adaptability and alignment. In addition, Table 2 also distinguishes the two approaches in terms of competitive priorities.

The extent to which agility, adaptability and alignment are achieved is determined by the specific relations in a work design network as indicated by the shading areas in Table 2. Social relations vary along three dimensions: structure, affect and cognition (Kang et al., 2007). Following Kang et al., we define network structure as the patterns of connections among work designers within and across organizations. The affective dimension address motives, expectations and norms among related parties. The cognitive dimension highlights the importance of shared representation, understanding and systems of meaning for work design. As discussed below, agility, adaptability and alignment are theoretically parallel to the three dimensions: cognition, structure, and affect.

(1) Agility and Cognitive Learning

An important basis for agility is organizational learning. Kang et al. (2007) suggest that two types of knowledge shared among related parties provide two types of cognitive mechanisms that can facilitate organizational learning: common architecture knowledge and common component knowledge.

Common architecture knowledge refers to a shared understanding among participant organizations about the interconnection of all components in some domain of interest, or of how things fit together (Matusik and Hill,

1998). To be agile, a work- design network needs to be alert to changes in supply and demand. The capacity of alertness benefits from the availability of knowledge that is sufficient in diversity and detail. Because of the cognitive limitation of any given individual, knowledge availability is greatly enhanced by knowledge shared and transferred among participants. In this sense, common architecture knowledge provides a cognitive mechanism to transfer and understand large amount of knowledge and complicated knowledge and experiences difficult to conceptualize adequately (Hill and Levenhagen 1995).

A work-design network involves the coordinated effort and integration of various parties. To be agile, a work design network also needs to be well-coordinated so that it can take quick responsive actions to changes. In that sense, common architecture knowledge is needed, which helps the participant organizations not only understand the larger picture but also recognize the sometimes conflicting demands in different components of work design. It facilitates the efforts of the designers, not matter who is a purchasing manager, a supplier or an industrial engineer, to integrate their knowledge with others, even if they do not have expertise in those other specialties.

Common component knowledge refers to the knowledge of "parts" or "components". Specifically, it is overlapping knowledge that relates to a subroutine or discrete aspect of an organization's operations. Common component knowledge also can contribute to the design of agile work systems. To explore new work design opportunities or alternative ways of design, designers must know enough about the content domain of other designers' expertise to assimilate it, interpret it, and recognize its value in work design. In other word, common component knowledge allows participant organizations to recognize, understand and assimilate novel knowledge from a wide range of related participants.

(2) Adaptability and Network Structure

Facing changes, adaptable work system will take appropriate actions such as outsourcing, changing partners, and creating new work ties. In social network literature, weak and non-redundant networks rich in structural holes are suggested to be more adaptable. The "hole" argument (Burt, 1992) describes a world of change, a world of discovering and developing opportunities to add value by changing social structure with bridges across holes in the

structure. In contrast, strong, and dense networks are not easy the change due to the strong connection among parties (Kim et al., 2006).

(3) Alignment and Development of Trust

Work- design networks vary widely in the degrees to which members share a common goal or recognize a common authority (Sinha and Van de Ven 2005). Participants in work design networks tend to pursue their different partisan interests in collaborating in the construction of an infrastructure that sustains the work system. As a result, incentives must be organized in such a way that all parties' interests are aligned. When designers are simultaneously dependent on and vulnerable to the actions and decisions of others and when hierarchical authority does not exist, trust becomes a major organizing principle (McEvily et al., 2003).

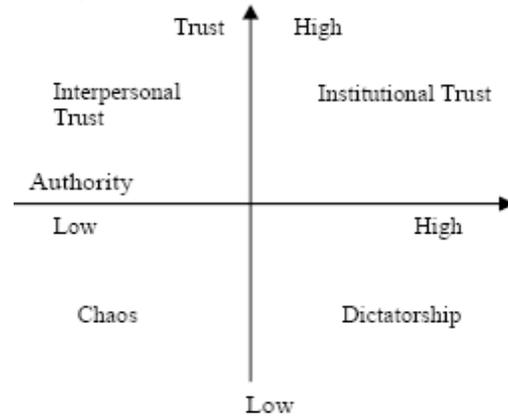


Figure 4. Trust in Managing Dependency

Researchers have argued that trust can take several distinct forms (Kang et al., 2007). Among them, institution trust can he developed through the security of rules, structures and organizations to buttress risks (Van De Ven and Ring, 2005); interpersonal trust can be developed through direct positive exchange experience. Although both of them can deliver many advantages to the alignment of participants in work design, interpersonal trust among participants in work design network requires less effort than dose institution trust, and it allows actors to flexibly customize to each other's needs. In addition, institution trust that is based on third party's sanction and monitor, on one hand, contributes to relational alignment by promoting expectations on long term relationships; on another hand, it contributes to information alignment by facilitating fine-grained and in depth knowledge exchange. In summary, possibilities for achieving alignment in work-design networks are shown within a space of dependency management as indicated in Figure 4.

Synopsis

The foregoing discussion suggests that organizations adopting network entrepreneurship oriented approach to work design take strategic actions to develop, cultivate and change social relations in their work design networks so that those social relations can have attributes conducive to agility, adaptability, and alignment.

Work design networks vary among organizations. The work-design network of an organization constrains its set of action options and shaping its dispositions. To understand what strategic actions organizations can take to direct their work design toward network entrepreneurship, we first introduce a typology

for work design networks to understand types of work design networks; then we explain the network entrepreneurial behaviors that can manifest in different work design networks.

3. Work Design Network Typology

A network actor's work design network has two dimensions: work design network diversity and work relationship strength. Work design network diversify refers to the range of work systems from which the actor (i.e. an ego node in social network) draws and receives support for work.

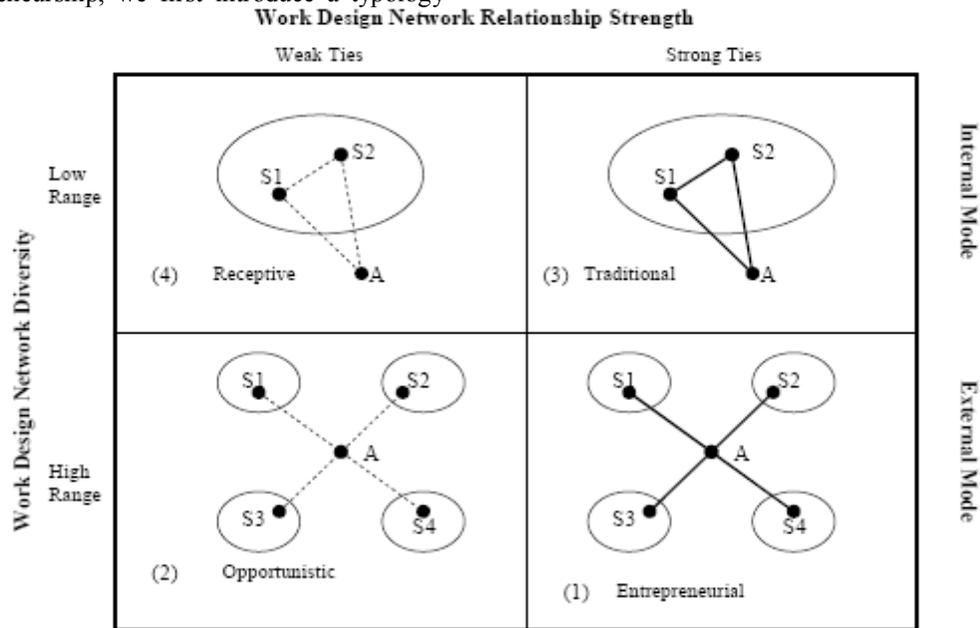


Figure 5. Work Design Network Typology (Adapted from Higgins and Kram 2001)

By work design network relationship strength, we mean duration, reciprocity and frequency of communication. The two dimensions are also consistent with core concepts in social network theory and research (for review, see Brass 1995, and Ibarra, 1993).

In social network research, the concept of network diversity concerns the extent to which the information provided by one's network is similar or redundant (Burt 1983, 1992; Granovetter, 1973). The less redundant the information provided by an ego node's network, the greater its access to valuable resources and information. There are two basic ways to define network diversity: 1) range, the number of different social systems from which relationships stem, and 2) density, the extent to which network nodes are connected to one another (Brass 1995;

Burt 1983; Krackhardt 1994).

To understand the relationship between the concept of work design network on one hand and social network theory on the other hand, consider the following examples. Suppose there is a network actor whose work design network spans organizational boundaries, involving suppliers, customers, scientists and lean manufacturing consultants. The range of this actor's work design network is relatively high. In contrast, a network actor with all four ties from within the same organization has less range. Consider an actor who has ties to five nodes. If the five nodes are connected pair-wise with each other, then the actor's work design network density is high. On the other hand, if there are no direct ties among the five actors, the work design network density is low.

The greater the range of the work design network, the less redundant the information provided. Similarly, the less densely interconnected a network is, the less redundant the information provided. Here, we adopt range as our specific conceptualization for work design network diversity. This is because it more closely captures changes in the current work environment that prompt organizations to look outside the organization for work assistance. Therefore, we define diversity of work -design network as range: the number of different social systems from which the ties originate.

Research from a variety of disciplines has shown that network actors bonded by strong ties tend to be highly motivated to collaborate with each other. In general, ties may be characterized as strong, weak or indeterminate (as with casual contacts or strangers). For purpose of characterizing a work-design network, we consider a relationship continuum that ranges from weak ties to strong ties.

The two dimensions, work design network diversity and work relationship strength form the basis of the typology of work design network that we introduce in Figure 6. This typology is adapted from Higgins and Kram (2001)'s research. Although their typology is developed to understand mentoring in current career context, it applies to conceptualization of work design network if we consider the work support from different ties as mentoring support.

The two dimensions of work design network yield four categories of work design networks: (1) entrepreneurial work-design network (high work design network diversity and high work design network relationship Strength); (2) opportunistic work-design network (high work design network diversity and low work design network relationship strength); (3) traditional work-design network (low work design network diversity and high work design network relationship strength); (4) Receptive work-design network (low work design network diversity and low work design network relationship strength).

Just as Higgins and Kram, we treat the two dimensions as dichotomous so that we can begin to develop theory regarding the very basic or ideal types of social structures of an actor's work design network. However, work-design network diversity and relationship strength are actually continuous rather than dichotomous dimensions. Work supporters are identified with S1, S2, S3 and S4 and the ego network actor with A. Consistent with social network research we

depict the connections between an actor and its supporters with a line: solid lines for strong relationships and dotted lines for weak relationships (Burt, 1983). We use ovals to denote the boundaries of social systems.

(1) Entrepreneurial work design networks

The entrepreneurial category captures both the wide ranging nature of the work design network as well as the strength of the ties. The strength of wide ranging networks derives from their ability to bridge otherwise unconnected clusters of participants. Burt (1992) shows that such network configurations, characterized by what he called "structure holes" can be valuable because they provide access to different sources of information. However, the value of the diverse ties cannot be realized if the work supporters (S1, S2, S3, S4) are not motivated to help the ego network actor (A) in its work. To get the benefit of the entrepreneurial opportunities that can be provided by its diverse ties, the ego actor need to have strong ties simultaneously with its work supporters, because strong ties motivate individuals to act on behalf of a local person (Granovetter, 1982: Krackhardt, 1992). Empirical research on strong ties has shown that strong ties exhibit the highest levels of trust (Krackhardt, 1992) and are particularly helpful during times of uncertainty (Krackhardt and Stern, 1988). Thus, *the key distinguishing feature of an entrepreneurial work-design network is that it is made up of heterogeneous work supporters who are highly motivated to act on behalf of the ego actor and who collectively provide the ego with access to a wide array of work related information.*

social network researchers have pointed out that strong ties will lead to network density because people with whom an individual has strong ties will tend to be affiliated (Berscheid and Walster 1978: Byrne, 1971). Such cases are always found within bonded social systems, such as organizations. However, for a work design network with work supporting ties spanning organizational boundaries and emerging from different social systems, strong ties do not necessarily imply interconnection among them.

(2) Opportunistic work design networks

What differentiates opportunistic work design networks from entrepreneurial work design networks is the strength of the relationships between the work supporters and the ego actor. The weak ties indicate low levels of reciprocity, infrequency of communication and emotional distance. In the opportunistic case, an ego actor tends to refrain from reciprocating,

communicating or expressing itself fully. In other words, the work support it can get is opportunistic: the ego get work support only when the support is offered or when it asks for help from others on occasion. *The distinguishing*

feature of opportunistic network is that an ego actor's openness toward receiving work support from multiple sources and its passive stance toward actively initiating and cultivating such relationships.

Table 3: Work design network Comparisons along Relational Learning, Adaptation and Alignment

| | Structure (Relational Adaptation) | Cognition (Relational Learning) | Affect (Relational Alignment) |
|---------------------|---|--|----------------------------------|
| Internal Work Model | | | |
| Receptive | Closed; But easy to change ties | Redundant information; low in common component knowledge and architecture knowledge | Low level of trust |
| Traditional | Closed and hard to change ties | Redundant information; high common component knowledge but low architecture knowledge | High level of trust |
| External work model | | | |
| Opportunistic | Open and easy to change ties | Non-redundant information; low level of common component knowledge and architecture knowledge | Low level of trust |
| Entrepreneurial | Open and hard to change old ties but easy to add new ties | Non-redundant information; high level of common component knowledge and architecture knowledge | High level of trust |

(3) Traditional work design networks

Traditional work design networks exhibit a cliques like structure composed of interconnected strong ties (Burt, 1980). We use the term traditional, because these work ties come from the same social system (e.g. S1, S2 work for the same employer), which is generally assumed to be the classic case of work. Given that the work supporters are affiliated with the same social system, it is likely that there will be interconnection between them. Because traditional work design networks are less likely to be as large as either opportunistic or entrepreneurial work design networks, we depict traditional work-design network as composed of fewer network nodes than the other types of work design networks. In addition, because the information received from a traditional work design network composed of work supporters who come from the same social system, is likely to be redundant or highly similar, we expect to find relatively fewer differences in the types of work assistance provided by a traditional work design network compared to an opportunistic or entrepreneurial work design network.

(4) Receptive work design network

Receptive work design network, is made up of weak working relationships that come from the same social systems. Given the similarity attraction hypothesis (Byrne, 1971), we expect

these weak ties in receptive work-design networks are interconnected. As in the traditional work-design network, the ego actor is more likely to receive similar information; yet unlike the traditional work design network, the work support provided is less likely to be strong.

We use the term receptive to describe this work design network, because it reflects the ego's expectation that these weak ties in receptive work design networks are interconnected. As in the traditional work design network, the ego actor is more likely to receive similar information, yet unlike the traditional work design network, the work support provided is less likely to be strong. *The distinguishing feature of a receptive work design network is the ego actor's openness to receiving work assistance from the same social system, but without actively initiating or cultivating work relationships.*

Because the work ties in traditional or in receptive work design networks come from the same social system, we refer to the two types of work design networks as internal work model. In contrast, we view opportunistic or entrepreneurial work design networks as being external work model.

Linking Work Design Network to Network Entrepreneurial Behaviors

Examining how different work design networks are associated with network entrepreneurship, as indicated in Table 3, we identify how different types of work design network affect a participant organization's behaviors in the network entrepreneurial process of work design with respect to relational learning, relational adaptation and relational alignment.

The organization with internal work model tends to have strong network inertia toward work with similar ones and is less likely to be agile and adaptable in a changing environment. On the other hand, the organization with external work model is more likely to work with different ones and is more agile and adaptable in work design. Between the two types of external work design network, an organization is more likely to be entrepreneurial in work design when working in a heterogeneous context because of its inertia to be proactive in building trust and cultivate strong relationships. Therefore, we advance the following assertion:

Assertion: The higher the entrepreneurial tendency of an organization in its work-design network, the more likely the work design network in which that organization is a driver is to facilitate network entrepreneurship in terms of relational learning, adaptation and alignment.

4. Conclusion

Our purpose in this article is to stimulate research and thinking how to facilitate knowledge flow to deal with dramatically changing and knowledge-intensive economic environment through appropriate work network design. Our review of the theory and research on work design suggests that a re-conceptualization of work design is needed. In the work design literature, we find a theoretical readiness to consider work design from a network design perspective, and in the operation management research, supply chain management research we find evidence to suggest that a reconsideration of the knowledge flows provided through working relationships is called for. In this article we capitalize on this momentum by positing theory and assertions in which work design is regarded as being the product of a work design network. The typology we introduce offers a starting point for investigating different types of work design networks in which an organization can participate. For instance, the concluding assertion about entrepreneurial work-design networks suggests a line of future research. We believe that the conceptual framework advanced

here has the potential to help explain entrepreneurial work-network behaviors of knowledge-based organizations at a strategic level.

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