

Standing on the Shoulders of Others: Network Ties and Individual Creativity

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ABSTRACT

Social network theory elaborates how network ties can generate social capital through structural access and relational mechanism, then to enhance individual creativity. By categorizing network ties into strong and weak in terms of tie strength, this article discusses how individuals may utilize differential types of network ties to come up with creativity. With less structural constraints, weak ties allow diverse and heterogeneous knowledge to prosper and facilitate building-up connections among diverse ideas to make creative attainments. On the other hand, with the relational mechanisms such as cooperation and trust, strong ties may reinforce psychological capital and in turn to sustain creativity. In summary, weak ties deliver informational benefit, one component of social capital, to directly rifle individual creativity from intellectual resource perspective; while strong ties offer solidarity benefit, another ingredient of social capital, to indirectly inspire individual creativity from psychological angle. Besides, this study highlights the moderating effect of knowledge articulability which constrains the relatedness between network ties and creativity. It hypothesizes when the extent of knowledge articulability is low, that is, low codifiability, high dependency and high ambiguity, weak ties will not be effective as for individual creativity. Two-wave survey will be employed to empirically test propositions.

Key Words: Network ties, psychological capital, knowledge articulability, individual creativity

I . INTRODUCTION

The rapid changing commercial landscape involving fierce competition, changed competitive pattern in emerging and existing markets contributes to the increased research interest towards creativity. Creativity is suggested to strengthen organization's capabilities of adapting and responding to contingencies or opportunities (Oldham, & Cummings, 1996; Kanter, 1983, 1988; March & Simon, 1958; Van de Ven, 1986). Long-term success and organizational effectiveness (Basadur & Hausdorf, 1996) especially in turbulent and uncertain times (Amabile, 1998) are dependent on individuals' creativity (George, 2007).

Creativity can be understood in several ways (Simonton 1999; Smith, Ward,

&Finke, 1995; Martindale, 1990; Simonton, 1989) either from the outcome (Amabile, 1983) or from integrated process. For instance, researchers in social and personality psychology tends to conceptualize creativity in terms of novelty, fluency, flexibility and originality (Shalley & Zhou, 2008; Zhou & Hoever, 2014). Tyler (1965) defined creativity as the recognition of possibilities, while Mackinnon (1960) proposed that creativity as an attribute of personality or a particular kind of response style. Moreover, creativity is thought as the ability to engage in productive thinking and the capacity to generate novel cognitive content (Guilford, 1965; Hirschman, 1980). Creativity also has been conceptualized as the production of ideas (Guilford, 1950; 1967) or novel, socially valued products (Taylor, Smith, & Ghiselin, 1963; Munford & Gustafson, 1988). Creativity even represents the possibilities of being translated into new products, procedures or services (Knapp, 1998; Andriopoulos & Dawson, 2009). In this study, I adopt the conventional definition of individual creativity, which refers to the creation of novel and potentially useful knowledge products by individuals without the real adoption or implementation.

Prior paradigm of creativity studies can be divided along two lines: componential and interactional. Componential framework (Amabile, 1983; 1988) explains how personal factors (e.g., domain-relevant knowledge and creativity-relevant skills), environmental factors (e.g. rewards) and psychological factors (intrinsic motivation) be aggregated to promote or inhibit individual creativity (Zhou, & Shalley, 2003). The interactionist approach is another research stream based on the assumption that individual creativity as a phenomenon can be influenced by the interplay between dispositional and situational factors. Just as Ford (1996) has stated, individual creativity is a consequence under the joint-influences of sense-making, motivation, knowledge and capability. Componential and interactionist approach have set preliminary foundation to explain how various factors impact individual creativity.

Previous research findings illustrate that a variety of candidate variables can affect creativity including social context, i.e. autonomy, organizational culture, social network, transformational leadership (Zhou, 2003; Gong, Huang, & Farh, 2009; Liu, Chen, & Yao, 2010; Perry-smith, 2006; Madjar, Oldham & Pratt, 2002; Hirst, Van Knippenberg, & Zhou, 2009; Zhou, Shin, Brass, Choi, & Zhang, 2009; Baer, 2010); motivational factors, i.e. learning orientation, harmonious passion, creative self-efficacy (Amabile, 1985; Liu, Chen, & Yao, 2010; Gong, Kim, & Lee, 2013; Gong, Huang, & Farh, 2009), personality factors, i.e. openness, proactivity (Prabhu, Sutton, & Sauser, 2008; Zhou, 2003; Gong, Cheung, Wang, & Huang, 2012), psychological factors, i.e. psychological safety (Edmondson, 1999; Gong, Cheung, Wang, & Huang, 2012), mood states (Isen, 1999; Madjar et al., 2002) and so on.

Creativity, or the recombination of novel and useful ideas, does not happen in a vacuum (Andrews, 1975). Creators rarely innovate alone or isolated from social bindings as lonely genius, alternatively, they tend to be nested in network interactions (Scott & Brown, 1999; Brown & Duguid, 2000) to get information and inspiration. Network ties act as the contextual antecedent of individual creativity. Network ties may

provide access to broaden information scopes and to improve information's quality or relevance (Adler & Kwon, 2002). In addition, the underlining norms and trust in network ties may help to lower monitoring costs (Ouchi, 1980) and positively motivate individuals' persistence. More importantly, network ties generate types of social capital, which can be categorized into intellectual benefits and solidarity benefits (Krackhardt & Hanson, 1993; Fisher & White, 2000; Shah, 2000). Social capital points to intellectual resources and solidarity benefits embedded in interpersonal relationships (Coleman, 1988; Lin, 2001) and mobilizing in purposive actions within network ties (Lin, 2001; Burt, 1992). Social capital enables effective and efficient (Bolino, Turnley, & Bloodgood, 2002) cooperation among individuals. Nevertheless, elaborating the effects of network ties on individual creativity by introducing the role social capital have not been properly investigated yet, which constitutes a research gap for this study.

Network size and strength affecting actors' access to information (Gabby & Leenders, 2001) can be leveraged as two primary network variables to simplify understanding about network ties. Network size represents the quantity of informational channel. Large number of ties are presumed to lead to larger amount of information gathering or accumulation. However, the overall pool of knowledge that actors can tap relies more on information diversity than on the number of ties (Anderson, 2008; Burt, 1992; Hansen, Podolny, & Pfeffer, 2001). Since the quality of information is meaningful comparing the amount, researches tend to emphasize more on network strength than on network size. Tie strength is a function of frequency, duration, emotional intensity, and reciprocity of interaction (Granovetter, 1973). Network ties manifested by low cohesiveness or presence of structural holes can be ascribed to weak ties (Burt, 1992), which are typified by infrequent interaction, limited emotional closeness (Baer, 2010) and salient structural advantages. In opposite, network ties with enhanced monitoring or social control (Sabel, 1993), reinforced positive expectation whereas high level of structural closure (Coleman, 1988) are accredited to strong ties, which is inherently affective rather than instrumental in nature.

The relatedness between network ties and creativity arouses great interests. Network structural configuration as well as other mechanisms shape the relationship between individuals and partially determine their access or potential to utilize and integrate different types of resources (Lam, 2000). Drawing on social network theory, Perry-Smith and Shalley (2003) examined the relatedness between differential network ties incorporating weak and strong ties and individual creativity surrounding the key concept of information. The interactions between individuals and communication spanning across personnel boundaries contribute to the development and flourishing of new knowledge (Nonaka, 1994). The basic assumption of the linkage between network ties and creativity lies in that the information resource acquired from network ties can be utilized, recombined and absorbed by an individual who strives for creative achievements. Generally speaking, weak ties allow access to wide range of knowledge, and facilitate the recombination and unusual connection among diverse informational (Mumford & Gustafson, 1988; Simonton, 1999). Theorists have proposed that the

communication of ideas with diverse others should lead to creativity referred consequences (e.g., Amabile, 1996; Gilson, 2001; Perry-Smith & Shalley, 2003). Weak ties pose structural “opportunities” of differing perspectives. Heterogeneous information and cultivated changeable angels may jointly contribute to the generation of novel or potentially useful ideas.

Previous research advise that weak ties rather than strong ties can benefit creativity. The assumption that weak ties are beneficial for individual creativity is mainly information-resource-centered. Weak ties provide greater amount of and diverse information (Powell & Smith-Doerr, 1994) to promote the development of creativity. Due to infrequent interaction and distant relationships, weak ties are instrumental in nature (Nelson, 1989; Wegener, 1991; Krackhardt, 1992; Podolny and Baron, 1997), which require relatively less time and effort to maintain than strong ties do. The underlying reasons can be explained in aspects: firstly, weak ties are expected to link to larger scales of network ties. In weak ties, individuals interact with others less frequently and less likely know each other than members of strong ties do, thus they are less probable to possess common knowledge background or redundant information (Burt, 1997; Granovetter, 1973; Murray, Rankin, & Magill, 1981). In addition, the effective network size or structural holes largely existed in weak ties (Burt, 1992; Nahapiet & Ghoshal, 1998) generalize a greater amount of diverse information (Anderson, 2008). Even more, due to the autonomy and less conformity, individuals within weak ties possess advantageous searching position and can more effectively search for information going outside established channels (Hansen, 1999).

On the contrary, strong ties having redundant information are perceived as inhibiting the development of creativity (Burt, 2004; Perry-Smith, 2006). For instance, Perry-Smith and Shalley (2003) argued that compared with stronger ties, weaker ties are more beneficial for creativity because the novel, non-redundant information is communicated freely (Shalley et al., 2003). Similarly, other scholars highlighted the informational contributions of weak ties due to the assumed opportunity of “exposure to divergent thoughts”. Strong ties with homogeneous information travelling along circular and redundant paths are suggested to handicap creativity development. Moreover, similar social cognition bases, norms or regulations induces the norm of conformity (Granovetter, 1973; Zhou et al., 2009; & Baer, 2010), which constrains the combination of dissimilar information (Zhou et al., 2009) and individuals’ cognitive attention transferring to novel ideas. Given the weakness of redundant information circulation and norm of conformity in conflict with the novelty feature of creativity, researchers reach their consensus that weak ties rather than strong ties are helpful to the development of individual creativity. In consequence, the role of strong ties is described as “negative” for creativity.

Nevertheless, the agreement that weak ties are beneficial for individual creativity encounters challenges partly due to some disadvantages of weak ties. Prior bodies of researches have not convincingly shown that weak ties actually result in high probability of creativity (Campbell, 1960; Simonton, 1999; Daft & Macintosh, 1981; Stabell, 1978).

Weak ties can be seen as a proxy for informational benefits, which not be equal to larger amount of information. Even more, the time cost devoted to fruitful discussions with each contactor increases rapidly (Zhou, Shin, Brass, & Choi, 2009). Superficial, short interaction and little involvement make weak ties gradually meaningless (Perry-Smith & Shalley, 2003) as for knowledge searching and gathering. Individuals may distract from their main creative task and feel exhausted to maintain large ties (Weick, 1995). Furthermore, individuals within weak ties may experience information overload. They may have difficulty in sorting through discordant information, creating new synergistic combinations (Ward et al., 1999) and are more easily getting lost in confusing and divergent perspectives (Zhou, Shin, Brass, & Choi, 2009). Scholars have found diminishing returns of the number of weak ties on creativity.

Weak ties are more valuable for preliminary and simple tasks, nevertheless, when the interdependence and supports become equally significant particularly for sophisticated and ambiguous tasks (i.e., creative tasks), fully-established network ties such as strong ties are required. Task contingency perspective reminds that we should take the sensitivity of task nature into consideration when determining the importance of weak ties or strong ties.

The potential relatedness between strong ties and individual creativity can be tackled from psychological angle. The salient solidarity benefits of strong ties may enhance individual's positive psychological state or motivation. Motivation, cognition, and context are all significant ingredients for creativity. Creative consequences are low base-rate occurred and inherently involve ambiguity and risks (Tesluk, Farr, & Klein, 1997), hence repeated trial and error are inevitable to realize the final "usefulness". To achieve creative attainments, individuals are required to willingly try for numerous times and possibly fail (Shalley & Gilson, 2004), to invest continuous efforts without self-doubt. Nevertheless, such willingness is relied on the individuals' motivation or confidence belief confronted with challenges (Shalley & Gilson, 2004). External resource input and contextual impacts make their respective effects on individual creativity through intrinsic motivation. Therefore, motivational variable can build up the linkage between contextual factor of strong ties and individual creativity.

Furthermore, drawing on self-determination theory, individuals having secure relationship and guaranteed autonomy would be intrinsically motivated and more probably focus on the causal relationship between efforts and achievement. With supports and identification with others, members within strong ties may keep interest and deepen their attention scope. Maintained interest and curiosity in learning will foster cognitive flexibility, willingness to take risks, and openness to complexity, which in turn expand individuals' access to potential solutions (Gagne & Deci, 2005; Amabile, 1979, 1996). Individuals may sustain their long-term persistence manifested by engaged efforts, concentration and strong interests.

Intrinsic motivation (Grant & Berry, 2011), positive affect (Silvia, 2008), creative self-efficacy (Choi, 2004; Gong et al., 2009; Jaussi et al., 2007; Shin & Zhou, 2007), harmonious passion (Liu, Chen & Yao, 2011) as well as personality factors have been

proposed as motivational antecedents of individual creativity. However, a more comprehensive construct covering the multi-facet positive psychological state should be utilized to account for the inadequate and inconsistent outcomes brought by one-facet construct, such as intrinsic motivation or creative self-efficacy. Incorporating facets such as confidence, positive attribution about efforts and success, redirection of paths and goals, and bouncing back when beset by problems (Luthans et al., 2006), the multi-facet motivational construct can serve as a more convincing mediator to connect network ties and individual creativity together. Psychological capital directly concerns “who you are” and “who you are becoming” (i. e., developing one’s actual self to become the possible self. Psychological capital delineate to which extent individuals can explore and utilize the social capital embedded in network ties depends on their internal willingness and capability. The synthetic variable of psychological capital can serve as the more appropriate mediator than intrinsic motivation between strong ties and individual creativity.

Additionally, this paper pays attention to the moderating effect of knowledge articulability, which can particularly shape the influence weak ties imposed on individual creativity. When the knowledge transferred is tacit (Winter, 1987; Zander & Kogut, 1995) and dependent, which means the knowledge is difficulty to understand and hard to be uprooted from existing environment, individuals can’t acquire, interpret and utilize this kind of knowledge from weak ties.

On the whole, this study examines the jointly effects of contextual factors and intrinsic motivational factors on individual creativity, which is consistent with Sternberg’s (2006) investment theory of creativity. That is, individual creativity consists of intellectual abilities, knowledge foundation, thinking style, personality, motivation and environmental supports either in the forms of visible or intangible assets, or capabilities. The article acknowledges that weak ties directly provide informational benefits to individual creativity, whereas strong ties rifle members’ positive psychological state and exert indirect impact on creativity. The basic idea is that differential network ties may influence individual’s creativity in differential aspects: weak ties construct the resource foundation for individual creativity and strong ties reinforce the psychological capital to sustain individual creativity. The main effects of network ties, the mediating role of psychological capital and the moderator of knowledge characteristics are stated.

Similar to other researches, this paper has some contributions. Firstly, it posits that network ties including weak ties and strong ties can serve as the contextual antecedent for individual creativity. In view that prior research deals with the contextual features of network ties and their impacts on individual creativity mainly from structural aspect, this paper fills in the gap of utilizing relational mechanism of network ties to understand individual creativity through elaborating the network ties—creativity linkage both from structural and from relational aspects, (Granovetter, 1985). In particular, incorporating the unique benefits of strong ties, complementary to the contributions of weak ties to creativity, this study extends and enriches the individual creativity research.

Secondly, this study examines the mediating role of psychological capital between strong ties and individual creativity. Social network literature fails to comprising motivational factors into fully consideration (Burt, 2000; Emirbayer & Goodwin, 1994; Stevenson & Greenberg, 2000). However, opportunities can't automatically turn into attainments, on the other hand, people differs in their incentives for information pursuit and exploration. Thus motivation is perceived as a critical factor influencing the exploitation of network resources and benefits (Burt, 2000). As one of motivation variable, psychological capital shows individuals' self-perceived ability and "intentions for effort allocations" (Kanfer, 1987), and enable proactive use contextual opportunity (cf. Burt, Jannotta, & Mahoney, 1998). Thereby, I propose psychological capital as the motivational prerequisite of individual creativity.

Last but not least, taking the moderator of knowledge articulability into account, this study highlights that the knowledge characteristics influence the extent to which individuals can interpret and understand transferred knowledge via weak ties. Hence knowledge articulability is hypothesized to moderate the relationship between weak ties and individual creativity. The overall conceptual framework is demonstrated in figure 1.

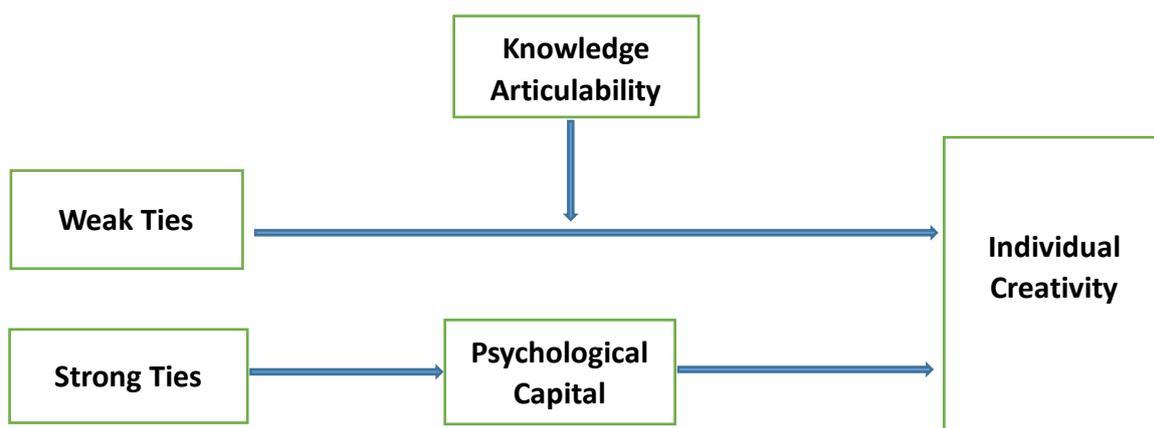


Figure 1. The Social Network Theory-based Model of Individual Creativity

II. THEORETICAL BACKGROUND AND HYPOTHESES

2.1 Network Ties and Social Capital

Network ties are “patterns of friendship, advice, communication or support” among individuals or members within a social system (Valente 1996; Burt & Minor, 1983; Knoke & Kuklinski, 1982; Scott, 1991). In short, network ties can be described as connections among members of an organization (Bolino, Turnley, & Bloodgood, 2002). Network ties serve an important function in building and maintaining of social capital

(Walker et al., 1997). Network ties stand at the heart of social capital analysis (Brass et al., 2004) because the source of social capital lies in “the structure and content of the actor’s social relations” (Adler & Kwon, 2002). Network ties are seen as the source of social capital due to structural advantages and relational mechanisms. The fundamental proposition of social capital theory is that network ties provide access to tangible or intangible resources and opportunities (Nahapiet & Ghoshal, 1998; Granovetter, 1974; Lin et al., 1981; Campbell et al. 1986; Flap and de Graaf, 1986; Coleman, 1990; Burt, 1992, 1997; Podolny & Baron, 1997) to creativity. Social capital is the accumulated asset exchanged or communicated in network ties. Social capital can be understood as “the goodwill available to individuals”, which facilitates resource exchange, innovation (Gabbay & Zuckerman, 1998; Hansen, 1998; Tsai & Ghoshal, 1998) and creation of intellectual capital (Hargadon & Sutton, 1997; Nahapiet & Ghoshal, 1998). As a function of network ties, social capital implies a source of potential value (Rodan & Galunic, 2004). Social capital can be manifested by information flow, influences or solidarity benefits available. Common goal, interest, or needs of various persons constitute network ties (Landherr, Friedl, & Heidemann, 2010). Social capital offers mobilized benefits to facilitate actions (Adler & Kwon, 2002).

2.2 Weak Ties and Individual Creativity

Structural characteristics of network are key determinants of information movement (Krackhardt & Hanson, 1993; Seibert et al., 2001; Walker et al., 1997; Bolino, Turnley, & Bloodgood, 2002), because structural features are associated with flexibility, ease of knowledge transfer, and impact the condition of accessibility to knowledge (Nahapiet & Ghoshal, 1998; Krackhardt & Hanson, 1993; McFadyen, & Cannella, Jr., 2004). As one kind of social capital, structural benefits indicate the advantages (e.g. access) individuals deriving from particular structural characteristics of networks (Rodan, & Galunic, 2004) including network configuration, appropriability (Nahapiet & Ghoshal, 1998) and the overall pattern of relations (Nahapiet & Ghoshal, 1998; Inkpen & Tsang, 2005) such as degree of closure, interconnectedness, strength (Nahapiet & Ghoshal, 1998; Coleman, 1988). Here the network configuration refers to characteristics such as structural holes (i.e., the absence of connections), centralization (the degree of concentration) and density (the extent of interconnection). Network appropriability relates the ease with which relationship can be transferred and affects flow of information and assistance within a network as well (Bolino, Turnley, & Bloodgood, 2002; Nahapiet & Ghoshal, 1998).

As for weak ties, structural characteristics are salient. Weak ties are typified by lower amounts of interaction, affection, cohesiveness and a shorter history (Granovetter, 1973; Krackhardt, 1992; Baer, 2010) as well as presences of structural holes (Burt, 1992). Due to connection with different social circles which permit access to non-redundant information (Zhang, et. al, 2009), weak ties are more likely dissimilar to ego, in turn to expose ego to heterogeneous knowledge or perspectives. Divergent pools of resources across different social circles may gather together via weak ties

(Granovetter, 1973; Marsden, 1982).

Despite pooling broad information together, weak ties also posit accesses to diverse perspectives (Brass, 1995; Perry-Smith & Shalley, 2003) free from predominant ideology control. Weak ties encourage the prosperity of information, and accommodate diversified perspectives of doing things with autonomy. Here autonomy means alleviated pressure of reciprocity or conformity. Burt (1997) sees the autonomy of actors as a crucial mechanism to promote effective coordination. Autonomy also helps to break up structural barrier and foster the free flow of knowledge.

Simultaneously, weak ties nurture the formation of cognitive habit including diversity and heterogeneity and cooperate this habit into one's cognitive process. Weak ties allow access to wide range of information and knowledge and promotes cross-fertilization of ideas stimulating individual creativity (Richter et al., 2012). Weak ties facilitate informational resources recombination and unusual connection (Mumford & Gustafson, 1988; Simonton, 1999) such that individuals who have sufficient resources such as materials and changeable angels may come up with novel and useful ideas. Weak ties cultivate individual's capability of taking others' perspective and absorbing information from heterogeneous origins. It is known that cognitive lock-in has the filter effect of isolating individuals from the outer world to prevent heterogeneous resources and perspectives to crowd in and reach for receivers (Grabher, 1993; Uzzi, 1997). By incorporating opposing positions into their own thinking and decision-making process (Chen, & Tjosvold, 2013), individuals may feel uncertain about the validation of their own position due to conflicting views and develop at least partial new ideas with broader perspectives or accurate views about problems. Theorists have proposed that the communication of ideas and information along with contacting with diverse others should lead to creativity referred consequences (e.g., Amabile, 1996; Gilson, 2001; Perry-Smith & Shalley, 2003). When individuals obtain a variety of alternatives, example solutions, or potentially relevant ideas in weak ties, they are more likely to make comparison and build connections, which would lead them to be creative (Amabile, Conti, Coon, Lazenby, & Herron, 1996).

On the other hand, creative ideas typically are the results of recombining different thought worlds, including those contradictory with one's own cognitive framework (Mumford & Gustafson, 1988) on the surface, but actually to be helpful to inspire one's intelligent development. Creativity is often associated with making new connections among distant ideas (e.g., Koestler, 1964; Simonton, 1999), breaking "set", or overcoming "functional fixedness" (Smith & Blankenship, 1991). Cognitive theorists (Flavell, 1968; Kohlberg, 1969) also posited that repeated interpersonal arguments and disagreements did encourage individuals to understand the perspectives of others, which are critical for cognitive development and reducing egocentric thought process (Tjosvold & Johnson, 1977). Creativity requires the cognitive-perceptual style of collecting and applying diverse information (Amabile, 1988). Individuals might develop their own ideas building on the ideas suggested by others known via weak ties. Therefore I propose that:

H1: Weak ties positively relate to individual creativity.

2.3 Strong Ties, Psychological Capital and Individual Creativity

Network ties with enhanced monitoring or social control (Sabel, 1993), high level of structural closure (Coleman, 1988) and reinforced positive expectation are considered as strong ties. Interactive, adaptive, flexible relation pattern and mutual vulnerability to fulfill tasks are prevalent in strong ties since strong ties have salient relational characteristics including trust, reciprocity, emotional intensity (Granovetter, 1973), shared norms, and mutual identification (Nahapiet & Ghoshal, 1998). The relational characteristics function as relational mechanism to highlight the quality of connections such as trust or intimacy (Nahapiet & Ghoshal, 1998; Granoveter, 1973). To specify relational mechanisms, there are three core facets: level of care (Putnam, 1993; Von Krogh, 1998), norm of cooperation (Coleman, 1990; Putnam, 1995) and sense of identification (Kramer et al., 1996). Care generates cognition, affection and behaviors such as trust empathy, willingness or access to help and leniency judgment (Von Krogh, 1998). Norm of cooperation enables to open access, tolerance of failure (Leonard-Barton, 1995) and motivation of engagement (Putnam, 1993). While sense of identification help individuals to form their membership identity (Nahapiet & Ghoshal, 1998).

Strong ties normally represent close social relationships among members and provide another type of social capital: benefits of solidarity incorporating trust and social supports. Trust implies potential vulnerability that others are willing to accept mistakes as learning experiences (Costigan, Ilter, & Berman, 1998) and tolerate risk taking (McAllister, 1995) in fulfill creative tasks. Trust also promotes individuals' confidence in their own capabilities such that "If they believe in me, I should believe in me too". In strong ties, developed interpersonal trust provides mutual confidence and further prevents opportunistic behaviors to ensure shared knowledge not be undermined or misused (Krackhardt, 1992; McEvily, Perrone & Zaheer, 2003).

Social supports implicitly predict high-quality relationship. Intrinsic motivation resulting from social considerations such as the desire to reciprocate (Granovetter, 1982), or from psychological considerations such as the desire to maintain balanced relationships (Heider, 1958), can affect members' willingness to provide supports (Reagans & McEvily, 2003). Available social supports provide a "safe net" that allows proactive joining, exploration and trial in broad work experiences, resulting in the acquisition of coping strategy, skills and self-confidence (Sarason et al., 1990). Since frequent interaction with supportive others plays a key role in the development of coping skills, subjects who have received social supports may perform better in difficult tasks than subjects who didn't obtain social supports.

Social supports signify secure relationships among members. Individuals who experience secure relationships in community (i.e. strong ties) would form their working models of others as available and supportive (Cutron et al., 1994). Social supports arouse

self-confidence, further to engender successful exploration (Cutrona, et al., 1994) and leads to break-through in creative efforts. Based on attachment theory, secure and supportive relationships induce low anxiety and high willingness to explore environment (Ainsworth, 1982). Individuals who perceived their immediate environment as trustworthy and supportive may utilize their captured skills and self-confidence to effectively master changing environments and cope with challenges (Cutrona, et al., 1994).

Additionally, social supports make individuals concentrate on their own efforts and suffer less from cognitive interferences, worries or depressions during the complementation process of creative tasks (Sarason, et al., 1986). The achieved feeling of certainty guaranteed by social support gives an individual a sense of control when they engage in creative tasks. White (1959) suggested that individuals have a motivation to interact with their environments to fulfill “behavior control” (Bell & Shaw, 1989), further to change and create tasks better suit their skills and abilities.

Moreover, social supports could lead to general positive mood state which fosters the development of creativity. When individuals experience positive mood, their creative thinking and problem-solving skills are largely improved (Hirt, Levine, McDonald & Melton, 1997). Studies have shown that excitement and energy may drive individuals to pursue novel solutions (Shalley et al., 2004). The broaden-and-build theory of Fredrickson (1998) suggests that positive affect broadens the scope of attention and cognitive flexibility, and increases cognitive variation. Isen (2000) also argued that when individuals experience positive mood, they make more connections between divergent materials, use broader categories, and see more associations among stimuli to induce creativity.

In strong ties, emotional attachment or commitment to close relationship and the willingness to offering social support is stronger than in weak ties (Robert Weiss, 1974). This article suggests that strong ties deliver solidarity benefits to individual creativity through the mediator of psychological capital. The definition of psychological capital is “an individual’s positive psychological state of development characterized by: 1) having confidence (self-efficacy) to take on and invest in necessary effort to succeed in difficult tasks; 2) making positive attribution (optimism) about present and future success; 3) persevering toward goals and directing paths to realize objectives; 4) sustaining and bouncing back (resilience) when beset by problems.

Psychological capital involves four components: hope, resilience, optimism, and efficacy. Hope is a positive motivational state that is grounded on interactively generalized sense of successful between agency (goal-oriented energy) and pathways (planning to meet goals) (Snyder et al., 1996). Hope represents the willingness to accomplish a task or goal and put in goal-direct efforts. Resilience is defined as “the positive psychological capacity to rebound, or bounce back from adversity, uncertainty, failure, changes and increased responsibility (Luthans, 2002). Resilient individuals are better equipped to deal with stresses in a constantly changing environment as they are open to new experiences, flexible to changing requirements and show more emotional

stability faced with adversity (Avey, Luthans, & Jansen, 2009). Optimism specifies to make an internal, relatively stable and global attribution regarding goal achievement, but attribute external, relatively unstable, and situation-specific cause to a failed attempt at reaching objectives (Luthans et al., 2008). Here optimism refers to realistic optimism (Peterson, 2000) based on checked process and realistic assessment. For optimist, setbacks are not necessarily seen as failures but as challenges and opportunities to be improved or leveraged to attain success (Luthans, Avolio, Walumbwa & Li, 2005). Efficacy is individual's conviction or confidence about one's abilities to mobilize the motivation, cognitive resources and courses of action needed to successfully carried out a specific task within a given context (Luthans, 1998).

Individuals develop their psychological capital partly from extensive assessment of surrounding resources and constraints, finally to yield interpretive conclusions or judgment (Gist & Mitchel, 1992; Tierney & Farmer, 2011). Through environmental scanning and evaluation, individuals may be more aware of the availability of specific resources, advantages and constraints of settings and transform the awareness into internal psychological state. Social supports, identification and relational closeness embedded in strong ties could be synergized and transformed into the accumulation of psychological capital. Therefore I propose that:

H2: *Strong ties positively relates to psychological capital.*

Since incorporated self-efficacy, hope, resilience and optimism can mobilize cognitive resource and capabilities to create positive outcomes (Bauer & Erdogan, 2014), psychological capital has been presumed closely related to job satisfaction, turnover intentions and stress (Avey, et al., 2011). Besides, it has been proposed that psychological capital mediates the association between supportive climate and performance (Luthans et al., 2008). Psychological capital here may serve the mediating role between strong ties and individual creativity for reasons.

At the individual level, psychological capital represents the psychological resource fueling personal growth and performance (Luthans, Avolio, Walumbwa & Li, 2005). Psychological capital affects how individuals' perceive and interpret events (Avey, Luthans, & Jansen, 2009). Psychological capital is identified as hidden factors that greatly affect the outcome of stressful and difficult tasks (Lazarus & Folkman, 1984) such as creative tasks. Psychological capital thus generalizes individuals' genuine interests and sense of control towards creative endeavors rather than contingent response to external rewards or punishments. In addition, psychological capital has important implications for behavioral performance as critical condition. Psychological capital transfers individuals' motivation from externally controlled to fully self-controlled because via enabling the internalization process of self-regulation (Deci & Ryan, 2008). With psychological capital, opportunities, resources offered by network ties could be synergized and transferred into psychological competency, which states the ability to think creatively, to generate alternatives and to engage in divergent thinking (Shalley & Gilson, 2004).

To be more concrete, psychological capital involves four components and here I investigate their respective relatedness with creativity respectively. As the first factor, hope means the willingness to succeed as well as the ability to identify, clarify and pursue successful goals flexibly and resiliently (Snyder, 2000). In other words, individuals have the willpower to open the pathway and finally to attain one's goals (Luthans & Youssef, 2004). Researches have suggested that hope relates to many important individual and organizational-level outcomes such as organizational commitment, job satisfaction and performance (Adams et al., 2002; Larson & Luthans, 2006; Luthans et al., 2005; Peterson & Luthans, 2003; Youssef & Luthans, 2007; Bauer & Erdogan, 2014).

The second element, optimism, can be conceptualized as the extent to which an individual ascribe positive events to internal, permanent and pervasive causes (Youssef & Luthans, 2007). Optimistic individuals make internal, stable and global attributions to positive outcomes but attribute external, unstable and specific reasons to failures (Seligman, 1998).

The third factor is efficacy, or confidence, which can motivate individuals' persistency and effort concentration, and reinforce intrinsic interest, while intrinsically motivated individuals tend to be more cognitively flexible and persevering (MaGraw & Fiala, 1982; McGraw & McCullers, 1979). Self-efficacy is considered as a necessary condition for creative productivity and discovery of "new knowledge" (Bandura, 1997). Self-efficacy also serves as a key motivational component of individual creative action (Ford, 1996) and typifies the achievements of cognitive processes that one has the self-confidence and the capability to fulfill a task. People with self-efficacy may find many alternative means of solving problems to utilize nontraditional approaches and more likely to become creative.

The fourth factor of positive psychology is resilience, which states the ability to bounce back from adversity, uncertainty, failure or overwhelming changes (Luthans & Youssef, 2004). Resilience can be characterized by positive and flexible coping and adaption when faced with adversity or setbacks hindering one's strives (Burns et al., 2008; Tugade et al., 2004). The function of resilience is maintaining individuals' physical and psychological health when undergoing uncertain activities (Maddi, 1987).

Given that creativity is creating something from nothing, individuals need to imagine both novel and useful things jumping out of conventional beliefs or constraints (Andriopoulos & Dawson, 2009). Psychological capital influences individual creativity in several aspects. Despite inspiring cognitive advantages targeted to creativity (Tierney & Farmer, 2002), psychological capital also enhances self-monitoring and motivates individuals to use learning strategies (Zimmerman, 2000). Individuals who feel capable of performing particular tasks tend to perform more effectively (Barling & Beattie, 1983). Furthermore, psychological capital signifies positive affectivity state, which mediates the relation between contextual factors and creativity (Madjar & Oldham, 2002; Madjar et al., 2002). Individuals would be more creative and more capable to recognize a problem and to integrate a variety of resources when they have positive psychological state. Psychological capital also influences individual selection, goals, emotional reactions,

effort, coping strategy and persistence (Gist & Mitchell, 1992). As the proverb says, “persistence is the other side of the creativity coin” (Adelson, 2003: 171). Persistence means in-depth exploration of only a few categories or perspectives (Nijstad et al., 2010) with the aim to achieve creative ideas, insights and problem solutions through hard work. Psychological capital also inspires and maintains individuals’ intrinsic interests to explore exempting from distraction or psychological depression. Psychological capital turns out to be critical resource to sustain stressful efforts and stimulate individuals’ full engagement into task itself, as well as minimizing symptoms of stress (Lazarus & Folkman, 1984). Therefore we propose that:

Hypothesis 3a: *Psychological capital positively relates to individual creativity.*

Hypothesis 3b: *Psychological capital mediates the relationship between strong ties and individual creativity.*

2.4 The Moderating Effects of Knowledge Articulability

Knowledge is distributed or shared among actors in network ties and has been identified as key strategically importance resource of organizations (Grant, 1996; Kogut & Zander, 1996; Nicksen & Zenger, 2004). With the aim to successfully convey source knowledge to a recipient (Cummings & Teng, 2003), knowledge distribution can be seen as a bilateral expectation that parties will proactively and voluntarily provide timely and rich information necessary for a successful relationship (Heide & John, 1992). However, knowledge transfer via network ties can’t be taken for granted or considered as automatic (Karamanos, 2003) for reasons. Knowledge is embedded in people and their skills, technical tool, routines, systems as well as network ties (Argote & Ingram, 2000). The accessibility of knowledge for recipient is vital for effective knowledge recreation and de-contextualization (Devadas & Argote, 1995; Dixon, 1994; Leonard-Barton, 1988; Moreland et al., 1996). The difficulties associated with knowledge distribution can be understood due to the dual interplay between knowledge characteristics, or the transferability of knowledge, and constraints of network mechanisms.

Knowledge tacitness is conducive to knowledge ambiguity (Simonin, 1999). Transferring complex knowledge with higher extent of tacit, ambiguity and dependent knowledge induces greater coordinative challenges (Grant, 1996; Nickson & Zenger, 2004) as well as inhibits its transfer to other contexts (Sorenson et al., 2006; Williams, 2007). If the knowledge to be distributed or transferred is complex and hard to articulate, the correspondent mechanisms of network ties should be as complex as to tackle the complexity of knowledge (Bhatt, 2000). Simultaneously, when knowledge is complex, the issue of authenticity of knowledge source arises, since knowledge receivers need to check the trustworthiness of knowledge source and veracity of knowledge communicated (Bhatt, 2000).

Given that tacit and dependent knowledge is hard to communicate and deeply rooted in action, involvement and commitment within a specific context (Polanyi, 1966), this

study denotes that some knowledge characteristics such as codification, independence and ambiguity (Thornhill & Amit, 2003) may possibly serve as barriers affecting knowledge transfer process (Ganco, 2013) and the outcome effectiveness. Referring to the extent to which knowledge can be verbalized, written, and drawn is relevant to the ease of transfer and transferring outcomes, knowledge articulability is used here to conceptualize relevant knowledge characteristics. The author analyzes the factors of knowledge articulability respectively and elaborates their moderating effects.

The first one is codification. Knowledge can be dichotomized by its explicitness and tacitness (Polanyi, 1966) in terms of its codification. Knowledge with a high level of codification can be ascribed as explicit knowledge, which is labeled as “conscious knowledge” or “objectified knowledge”. Explicit knowledge represents the shared corpus of knowledge which is available to the individual in the form of facts, concepts or frameworks that can be stored and retrieved from memory or personal record. Explicit knowledge is sequential, related to the history and can be drawn from theory, and formally transmitted in systematic language (Nonaka & Takeuchi, 1995).

Conversely, knowledge with a relative low level of codification generally referring as tacit knowledge, or “automatic knowledge”, includes theoretical and practical knowledge resided in the experiences and enactment of the collective (Brown & Duguid, 1991). The importance of tacit knowledge has been identified as providing boundary-spanning knowledge (Kasperson, 1978). Tacit knowledge differs from explicit knowledge which is uttered and captured in codified forms such as drawings and writing (Nonaka, von Krogh, 2009). On the opposite, tacit knowledge is unarticulated and ties to the sense, movement skills, physical experiences, intuition or implicit rules of thumb. Tacit knowledge is personal rooted, context specific. It resides in people’s beliefs, values, experiences, organizational routines and institutions (Inkpen, 1998). Thus tacit knowledge is hard to formalize, articulate and communicate (Nonaka & Takeuchi, 1995) and can only be revealed through practice in a particular context and transmitted through network ties (Lam, 2000; Hamel, 1991). Tacit knowledge may remain relatively hidden from individual actors but be accessible and sustained via close interaction (Spender, 1994). Moreover, tacit knowledge is partly subjective rather than objective. It is rarely taught or documented (Sternberg & Lubart, 1995) but related to practice. Taken network institutions into consideration, transferring tacit knowledge is effort-consuming process and depends more on mechanisms of coordination and trust (Karamanos, 2003).

Simultaneously, Simonin (1999) found that knowledge tacitness is positively and significantly connected with knowledge ambiguity, or causal ambiguity. Causal ambiguity means that componential factors, such as related knowledge elements, subnetwork details, and their interactions, can’t be precisely determined, thus difficult to identify the overall template (Lippman & Rumelt, 1982; King & Zeithaml, 2000). Because causal ambiguity is usually associated with “a wide gap between the espoused description and the actual functioning of the template (Szulanski, Cappetta & Jensen, 2004), it might limit the depth of understanding about knowledge source and influence the effectiveness of knowledge transfer (Spender, 1996).

Another knowledge characteristics, independence, refers to the extent to which knowledge to be transferred is independent or is a factor of a set of interdependent components (Teece, 1986; Winter, 1987). Independent knowledge points to stand-alone component which can be uprooted from its existing usage context easily (Hansen, 1999). Dependent knowledge is closely tie to the person who has developed it (personalisation) and to specific context (contextualization) (Cater & Scarbrough, 2001).

Non-self-explanatory, dependent and ambiguous (Zander & Kogut, 1995) knowledge is poor articulable in nature and hard to teach, learn, and transfer (Hakanson & Nobel, 1998). Poor articulable knowledge always prescribes continuous efforts of knowing (Nonaka, 1994). Transferring dependent knowledge has been proved to be difficult (Teece, 1977; Zander & Kogut, 1995) within weak ties due to the infrequent interactions or non-adequate communication. Even worse, when problems arise, the information source is not immediately available (Hansen, 1999) to give feedback or discuss solutions. Furthermore, recipients would have difficulty to interpret and understand tacit, ambiguous and dependent knowledge, since this kind of knowledge poses heavy cognitive burden for individuals and requires intensive efforts to figure out. Hence I suggest that extent of knowledge articulability would affect the effectiveness of knowledge transfer process in weak ties but not in strong ties. To convey or share codified, independent and clear-recorded knowledge is relatively easier in weak ties than to decode or elaborate tacit, dependent and ambiguous knowledge, which is generally not ready for immediate use or understanding. Rather, in strong ties, individuals who share more similar experience or expertise due to relational closeness can utilize frequent and thorough communication or feedback-seeking activities to enhance their understandings and to elaborate knowledge which is tacit, ambiguous and dependent. Even more, individuals in strong ties sharing more similar background knowledge may have more opportunities or channels to exchange their deep-level insights or transform tacit knowledge into formalized or articulated explicit knowledge to enable understandings without being handicapped by poor articulable knowledge. In strong ties, stronger motivation to assist a frequent contact and the relatively easier knowledge transferring process (Reagans, & McEvily, 2003). Here I hypothesize that weak ties will probably suffer with poor articulable knowledge in knowledge transferring process, but strong ties may exempt from these threats posed by poor articulable knowledge:

Hypothesis 4a: *Knowledge articulability moderates the association between weak ties and individual creativity in such that, the connections between weak ties and individual creativity will be stronger when the extent of knowledge codification and independence is high whereas the extent of knowledge ambiguity is low.*

Hypothesis 4b: *Knowledge articulability moderates the association between weak ties and individual creativity in such that, the connections between weak ties and individual creativity will be weaker when the extent of knowledge codification and independence is low whereas the extent of knowledge ambiguity is high.*

III. SCHEDULED EMPIRICAL STUDY

3.1 Sample and Procedures

Approximately ten companies are invited to participate this survey and the size of the targeted companies ranges from 50 to 500 employees. The author would take charge of distribution and collection of all questionnaires and all the participants are recruited on a voluntary basis. Data are to be collected through two waves of survey studies. Wave 1 (T1) is targeted to employees to measure their demographic variables, attributes of network ties; while Wave 2(T2) is designed to measure from two aspects: 1) for employees: knowledge articulability, relational mechanism such as interpersonal trust, social support for creativity, cooperation; 2) for supervisors: supervisors' demographics, their rating of employees' creativity behaviors and performance. Three versions of questionnaires for this study will be administrated, with two versions for the subordinate employees and one version for their immediate supervisors. Scales are translated from English to Chinese and then back-translated into English by two independent bilingual doctoral students to ensure equivalency of meaning (Brislin, 1980).

The two-wave subordinate questionnaires will be administrated three months apart to the same employee in an attempt to elicit common method variance problems. The questionnaires for supervisors are administered simultaneously with the second-wave questionnaires for employees. The aim of survey, confidentiality of attendants' self-reports, instruction to fill in and the importance of being accurate in their ratings are explained clearly before the survey started. A cover letter will help to explain the purposes of the survey and guaranteed anonymity.

3.2 Variables

Except for dummy variables, other items on the questionnaire are rated on Likert-scales (e.g., 5-point: *1=strongly disagree* to *5=strongly agree*). Translate-and-translate method (Brislin, 1980) is used for data interpretation as all scales were originally designed in English but the participants are Chinese speakers.

Network ties. Social network theory usually analyzes network ties in two ways: socio-centric and ego-centric and we collected network data using a combination of socio-metric and egocentric techniques (Wasserman & Faust, 1994). Socio-metric techniques provide with each respondent a fixed contact roster then ask the respondent to depict his or her relationship with every individual on the roster. The virtue of socio-metric approach is that it provides referent information about all interactions involved in a network (Reagans & McEvily, 2003). The drawback of socio-metric approach is that it can't delineate personalized boundary around the network (Laumann, Marsden & Prensky, 1983) thus give rise to inaccuracy as to network data. Since respondents' assessment of network connections including distant individuals is less accurate (Krackhardt & Kilduff, 1999). To distinguish the network boundary varied

from one person to others, we additionally ask each respondent to specifically report and describe his or her connections within the scope of contact roster with more accurate network data on that part of the network with which they are most familiar (Kumbasarr, Romney & Batchelder, 1994). The complementary approach using ego-centric techniques is that asking each individual responds to a series of questions generating names and a roster of individualized contacts consequently (Fisherr, 1982; Burt, 2002) as well as describe his or her familiar network ties with more accuracy (Reagans & McEvily, 2003). Individual responses can be aggregated to describe the total network and a network can be constructed between different members grounded on their reported relationship with each other (Reagans & McEvily, 2003). But the potential drawback of ego-centric approach is that it can miss critical interactions lying outside a respondent's frame of reference (Reagans & McEvily, 2003).

In the future study we will apply both socio-metric and ego-metric techniques to collect network data. Firstly, we will use the socio-metric technique and generate a roster of employees' names in a company assuming that the general boundary of respondents' interactions is within a company given that strong ties are more easily recalled in the absence of a roster of all employees (Zhou, Shin, Brass and Choi, 2009). After narrowing down the network scope, we will employ ego-centric approach to ask each respondent to pick up his or her typical close connects and distant connects by the indicator of closeness. Close relationship has been said to be "strong" ties while relatively distant relationship has been called "weak" ties (Erickson et al., Murray et al.). The virtue of ego-centric method is that it can capture actors' network ties (e.g., Smith, Collins, & Clark, 2005) by accommodating with both formal organizations and informal communities with vague boundaries such as network ties, sense of community (Haythornthwaite, 1996). Individuals can evaluate their own network ties in ego-centric way by self-report rating in survey process. Combining socio-metric and egocentric technique will guarantee that the network will contain a wider circle of colleagues around each respondent than a narrow one based on either technique, since socio-metric technique is more likely to elicit weak ties while egocentric approach is more probably to incorporate strong ties (Reagans & McEvily, 2003).

Tie strength. Strength of ties is measured as an index including the mean of the duration of relationship, frequency of interaction and emotional intensity of key contacts (Smith, Collins & Clark, 2005). Exemplary questions such as "How close are you with this person" (1=distant; 2=somewhat distant; 3=neutral; 4= somewhat close; 5=very close), "How many years has each relationship been in existence?", and "On average, how frequently do you interact with each person?" .

Knowledge articulability: includes knowledge codification, ambiguity independence. We transform the items from De Luca, L., Atuahene- Gima, K. (2007), Hansen (1999), Szulanski et al. (2004), Lippman et al. (1982) and Chiu et al. (2006). The sample items read "All the information/advice the person explained to me in writing

(involving written reports, manuals, e-mails, faxes, etc.)” (Knowledge codification); “The limits of the (practice) are inadequately specified” (knowledge ambiguity); and “The knowledge I acquired from this person is of applicability only in our business” (Knowledge dependency).

Psychological Capital. We apply and transform the subscales from Luthans, Avolio, Walumbwa, and Li (2005). The 24 items are tailored accommodate to creativity and sample items read “*I can think of many ways to reach my current work goals*” and “*I quickly get over and recover from trouble or setback at work*”.

Individual creativity. We adopt Zhou and George’s (2001) 13-item scales of creativity and exclude some redundant items. Sample items read “*Suggests new ways to increase quality*” and “*Come up with creative solutions to problems*”.

Control variables. Following up previous research on creativity (e.g. Amabile, 1983, 1985; Baer, 2010; Zhou, 2003, 2012; Perry-Smith, 2006), we will control for demographics variables including gender, age, education, professional experience and organization tenure to account for possible confounding effects.

IV DISCUSSION

4.1 Targeted Implications and Conclusions

In this conceptual paper, the author discuss the differential roles of weak and strong ties for individual creativity. With salient structural advantages, weak ties offer informational resource to individual creativity; while strong ties promote the formation of individuals’ psychological capital to inspire and sustain creative efforts. Besides, the article addresses the moderating effects of knowledge articulability during the knowledge transfer process of weak ties.

4.2 Limitation and Future Works

Currently, this paper is at conceptual stage and need to empirically test forwarded hypotheses. The aim of this research is to provide some managerial implications for managers who are interested in reinforcing employees’ creativity. There are some limitations existed in current research. First, most of the data will come from questionnaire-based, self-reported measures, thus common-method-bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003) and egocentric bias (Parker, Williams, & Turner, 2006) may pose some threats to the future practical study. The author try to alleviate the potential problems by applying temporal separation between waves of studies. To be specific, self-reported scales from employees including demographic variables, the structural and relational dimensions of network ties will be measured at pre-study session. Network mechanisms (the relational dimension of network ties), knowledge articulability

will be re-measured at T1. Other-rating scales of individual creativity will be rated by supervisors at T2. The temporal separation of variables and demographic variables controlling all minimize the probability that major findings are threatened by common method bias (Liu, Lee, Hui, Kwan, & Wu, 2013).

The author also noticed the documented curvilinear relationship between weak ties and individual creativity in former studies. In future research, I will further examine the possible explanation for the reported observation. The interplay between strong ties and weak ties will also be investigated.

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