Using the Basadur Profile to Advance Non-Structural Social Networks Innovation

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Abstract

We update and deepen research conceptualizing how social networks with an abundance of weak links may influence innovative performance in organizations. We integrate social networks research and theory with a four stage innovation process to describe how innovation styles as measured by the Basadur Profile can be used to impact organizational adaptability through innovation. Research exploring the relationship of social networks with innovative thinking has primarily taken *a structuralist* approach, which emphasizes making diverse, unique knowledge accessible through organizational structures that provide a greater abundance of weaker relationships (weak ties) to introduce new or novel information or ideas. We introduce *a non-structural* strategy which employs employee cognitive innovation style differences to create the diversity to power a four stage innovation process that not only provides more efficient discovery of novel inputs (information, problems, possibilities, opportunities, insights) but also integrates the novel inputs provided by the weak network links as the first stage (generation) of a researched organizational innovation process that flows through the remaining continuous stages of well defined, well designed, and successfully implemented new innovations (stages 2,3,4: conceptualization, optimization, implementation). We review testable propositions and possible avenues of future research**.**

Keywords: Organizational Social Networks, Weak Ties, Innovation, Creativity, Process, Assessment, Non-Structural Networks, Diversity, Basadur, Profile, Cognitive Skills, Problem Solving, Style

Introduction

Basadur and Basadur (2010) built upon previous conceptualizations of how social networks with an abundance of weak links may influence innovative activity in organizations. They showed that unique, diverse information must be available in one's social network (the CONTENT), but appropriate PROCESS skills are also required to appreciate, accept, convert and integrate the information into potential challenges and ideas. This combination fits neatly into the first two stages (Generation and Conceptualization) of a four stage innovation process of applied creativity which occurs in a real-world industrial, organizational or social context, pertains to the finding or solving of complex problems, and has a creative product or plan as the final result (Basadur & Gelade, 2006; Kabanoff & Rossiter 1994). Finally, they integrated social networks research and theory with the process and related cognitive thinking skills to describe how social interactions drive innovation in organizations. They concluded by introducing several testable propositions and outlining possible avenues of future research. The purpose of this paper is to update and deepen understanding of this research and findings.

Background: The Need for Innovation

Because rapidly accelerating change and frequent major discontinuities and interruptions now dominate the world in which we live and work, the goal of improving and increasing the survival of organizations has become increasingly more complex. Many organizations that prospered during more stable times – times that rewarded routinized efficiency – now find themselves poorly aligned with today's new economic and social realities of accelerating change, uncertainty, globalization, increased competition, and pressure for revenue growth. The most perplexing challenge now facing business and industry organizations is how to be more innovative. Researchers and practitioners around the globe are attempting to help organizations in their struggles to innovate and gain competitive advantage in the face of intensifying competition and globalization of markets (e.g. Amagoh, 2008; Hashmi, Ishak, & Binti Hassan, 2018; Isaksen & Akkermans, 2011).

While many corporations recognize the need to innovate, they also find it difficult to do. Indeed, many leading management consultants exhort corporations to "begin their revolutions" – to expand their thinking and do things differently. Rather than simply improve existing methods and procedures, they advocate deliberate change. Corporations are advised not to defend old markets, but to explore new ones – a strategy many find appealing but difficult to implement.

Innovation as Tools and Techniques

A plethora of tools and techniques have been employed through the years to help organizations become more innovative. Basadur, Gelade and Basadur (2014) provide an extensive list including: identification of more creative people through cognitive, aptitude and personality tests; differentiating people with more "adaptive" styles of creativity from people with more "innovative" styles of creativity (Kirton, 2003); identifying organizational and environmental factors that might inhibit or nurture innovative performance such as leadership, motivation, climate, goals, incentives and freedom from time pressure; training individuals and teams how to use their imagination and judgment to solve problems better; assessing the degrees of innovativeness of an outcome; providing creative thinking tools including "brainstorming" and "design thinking" to address specific needs; locating accessible innovation think tanks and idea accelerators; installing operations-based continuous process improvement methodologies

such as Six Sigma and Lean, and idea optimizing and "go to market" planning methods such as Stage Gate. These tools and techniques (and many others) have not meaningfully impacted significant or breakthrough innovation. Most have ended up being "flavors of the month". Organizational obsolescence has remained rampant. Think of Kodak, Polaroid and Blackberry. And new start- ups fail almost 70 percent of the time (Griffith, 2017).

Innovation as a Process

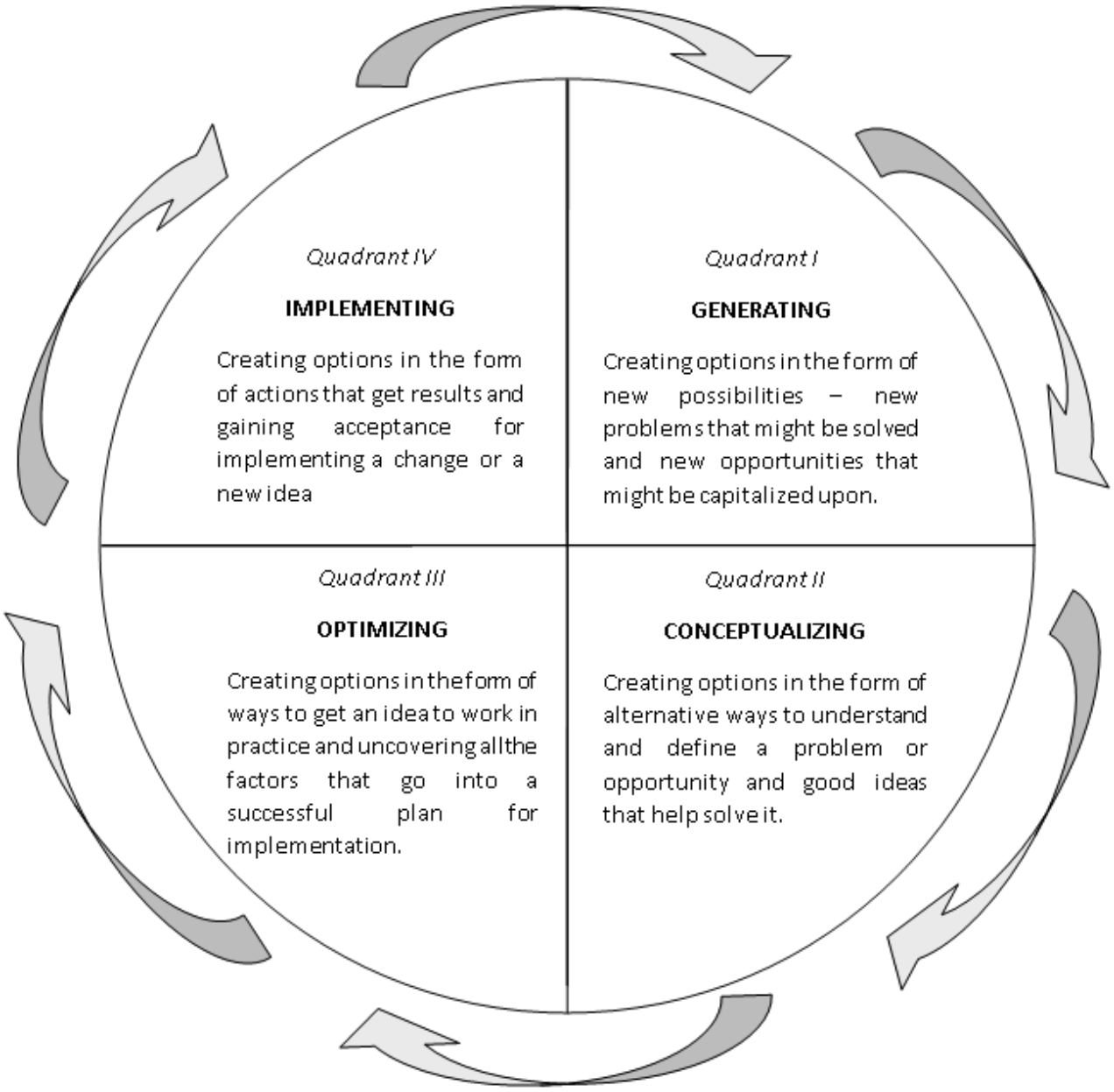
Mott (1972) presented evidence that effective organizations display two characteristics simultaneously: efficiency and adaptability. The efficient organization follows well-structured, stable routines to deliver its products or services in high quantities with high quality and at low cost. In a stable world, efficient organizations may be successful. But in a changing world, organizations also need adaptability. While efficiency implies mastering routine, adaptability means mastering the process of deliberately changing routine. Adaptability is a proactive process: it allows the organization to deliberately and continually change and create. It entails deliberate discontent – proactively looking for new problems to solve, finding new things to do, and adopting new technologies and methods ahead of the competition. Dolata (2013) identified proactive adaptability as the trait differentiating companies capable of responding proactively to dynamic environments from those unable to make crucial change. Adaptability is disruptive. It requires looking outside the organization for new opportunities, problems, trends, technologies, ideas and methods that may dramatically improve or completely change routines or introduce completely new products and services. Adaptable organizations anticipate problems and opportunities, and develop timely solutions and new routines. They deliberately and continually change routines to improve quality, raise quantities, reduce costs, and stay ahead of competitors. Basadur and colleagues (e.g. Basadur & Gelade, 2005; Basadur & Gelade, 2006) proposed that adaptability can be conceptualized as a four-stage process of innovation, comprised of generating, conceptualizing and solving important problems and implementing valuable new solutions (see Figure 1 on p. 7).

The first stage of our innovation process, *Generation,* is the proactive acquisition and generation of new information, and the sensing of trends, opportunities and problems. This is what Simon (1977) called "opportunistic surveillance". Here, physical contact with, and involvement in, real world activities alerts the individual to inconsistencies and difficulties. These inconsistencies are then used to suggest new problem areas, to identify opportunities for improvement and innovation, and to propose projects that might be worth undertaking. At this stage, problems and opportunities are recognized, but are not yet clearly articulated or understood.

In the second stage, *Conceptualization,* a problem or opportunity identified in the previous stage is analyzed to create a comprehensive conceptualization or model of the problem domain. Here, understanding of the problem area is gained not by direct experience but by abstract analysis. This conceptual knowledge is then used as the basis for ideation whereby one or more solutions for the problem are developed. In the third stage, *Optimization*, the conceptualizations of the previous stage are critiqued against real world constraints in order to identify practical difficulties. Alternatives are systematically examined in order to develop a plan for implementing an optimal solution that can be executed with existing resources. The fourth stage, *Implementation,* completes the creative process. Cognitive activity in this stage consists of experimenting with the new solution, evaluating the outcomes, and making adjustments if necessary to successfully implement it.

Figure 1 The Four Stages of the Innovative Thinking Process

The Four Stages of the Innovative Thinking Process



The process is continuous, and begins with an initial stage of deliberate seeking out (*generating*) of new problems and opportunities as an everyday activity. The second stage involves *conceptualizing,* that is formulating, defining, and constructing a newly generated problem, and is followed by the emergence of a solution in the third stage. Following the implementation of the solution, the process begins anew, as the implementation of the new solution sparks new opportunities to be discovered and also permits further development of the implemented solution. Thus, the process is dynamic and continuous. Every implemented solution (action) results in the opportunity to discover (generate) new problems and opportunities to trigger the process to begin anew.

Emphasizing that continuous innovation begins with problem generation, this process serves as a model for organizational adaptability. Adaptable organizations continually and intentionally scan the environment to anticipate new opportunities and problems, and to proactively find new products, services and procedures to implement, thus leapfrogging over their competitors. Each implemented solution leads to new problems to be discovered.

It should be noted that early research into innovation was largely confined to testing the value of "brainstorming" ideas to defined problems. Basadur, Graen and Green (1982) expanded this notion to a "complete process of creative problem solving" by adding problem finding and solution implementation as the beginning and ending stages to problem definition and solution finding stages. Basadur (1987) and Basadur, Graen and Wakabayashi (1990) extended the model further to a cycle of four distinct sequential stages called Generation (problem finding), Conceptualization (problem formulation), Optimization (problem solving) and Implementation (solution implementation) as shown in Figure 2 (see p. 11), and modelled innovation as a process of applied creativity occurring in a real-world, industrial, organizational or social context; pertaining to the finding or solving of complex problems and having an actual behavioral creative product or plan as the final result (Kabanoff & Rossiter, 1994).

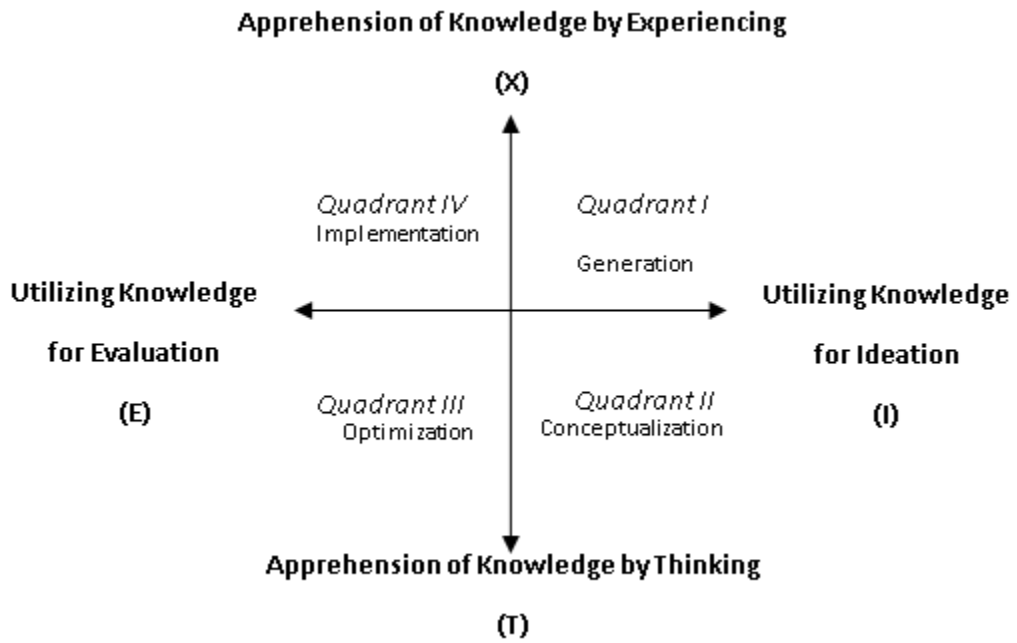
Basadur and Gelade (2006) established the four stage innovative thinking process of Figure 1 to clearly distinguish the term "*innovation* process" from "*creative problem solving* process". By its inclusion of the first process stage, Generation, (or problem finding), this approach differs from virtually all other creativity and problem solving process models which typically pre-suppose that a problem, task or goal requiring creativity already exists or has been presented, and that a creative process is then subsequently applied. Figure 1 explains a different, more comprehensive process of creative *behavior* which begins *before* a problem is available to be identified or formulated, and continues until the action required to implement a solution is taken. This approach, which models adaptability directly, is more consistent with what goes on in real world situations. It directly reflects the results of field research (Basadur, 1992), which showed how innovative Japanese companies engage their employees in continuous problem finding, defining, solving and solution implementation as part of regular work. Basadur and Basadur (2011) provide research showing that the people who prefer the generation stage activity (generators) are under-represented in industrial and business organizations and are likely to be found in occupations normally found *outside* such organizations, for example, artists, writers, designers, teachers, and academic institutions. They argue that organizations seeking increased creativity and innovation could do so by understanding and recognizing the contributions made by people preferring the generator style, and by making generator activity more attractive for all members of the organization. Basadur et al. (2014) established the the psychometric properties of the Basadur Profile and the distribution of styles in different occupations, and at different organizational levels.

The Basadur Profile

The four stages of the innovation process in Figure 1 (see p. 7) each involve a different type of cognitive activity. These different cognitive activities are defined in terms of two orthogonal dimensions. One dimension, plotted on the vertical axis of Figure 2 (see p. 11) represents the Apprehension of knowledge, and the other, plotted on the horizontal axis, represents the Utilization of knowledge. Both dimensions are bipolar, and the four different cognitive activities give rise to the four successive stages of the creative process.

Each stage involves a different kind of cognitive activity. Individuals have different preferences for each stage and thus have different innovation "styles". The Basadur Innovation Profile measures these styles, and maps onto and interconnects directly with the four stages of the innovation process. Basadur et al. (2014) presented field research (n=6,091) in which the psychometric properties (internal consistency, scale reliability and scale discrimination) of the Profile were established, as well as the distribution of styles in different occupations, and at different organizational levels. In another field study, Basadur, Gelade and Basadur (2009) established the predictive validity of the Profile. The real world behaviors of participants significantly matched those predicted by the assessment. Basadur and Head (2001) and Runco and Basadur (1993) provided additional evidence of validity.

Figure 2 The Two Dimensions of the Innovation process



The two poles of Apprehension are: direct, concrete *experiencing*, denoted X, and detached, abstract *thinking*, denoted T. The distinction between these two types of knowledge acquisition has a long history, going back at least as far as Kant (1798/1978), who distinguished between sensory and intellectual cognition. It was subsequently recognized by Thorndike (1931) (learning by trial and error vs. learning by ideas) as well as later authors (e.g., Kolb, 1976: concrete experience and active experimentation vs. reflective observation and abstract conceptualizing). Similarly, Guilford (1967) differentiated the mental operation of cognition

(gaining knowledge by experiencing) from the mental operation of convergent production (converting given information into the "correct" answer; this is what Sternberg (1996) defined as theoretical, analytical intelligence).

The two poles of Utilization are: using knowledge to create or entertain various possibilities, points of view and options (ideation, denoted I), and using knowledge to judge and select (evaluation, denoted E). We conceive these poles as corresponding respectively to Guilford's (1967) divergent production and evaluation. All individuals are able to utilize their knowledge in both ways, but tend to prefer one or the other.

We next describe how the dimensions of knowledge Apprehension and knowledge Utilization relate to the four hypothesized stages of the innovation process. (For more detailed descriptions see Basadur and Gelade (2005) and Basadur et al. (2014).

Stage I. The first stage is called *Generation* and involves Apprehension by Experience and Utilization for Ideation. Here, physical contact with, and involvement in, real world activities (X) alerts the individual to inconsistencies and difficulties. This knowledge is then used to suggest new problem areas, to identify opportunities for improvement, and to propose projects that might be worth undertaking (I). At this stage, problems and opportunities are recognized, but are not yet clearly articulated or understood.

Stage II**.** This stage is called *Conceptualization* and involves Apprehension by Thinking and Utilization for Ideation. Here, a proposal, problem, or opportunity identified in the previous stage is systematically thought through (T) to create a sound conceptualization or model of the problem domain. Here, understanding of the problem area is gained not by direct experience but by abstract analysis. This conceptual knowledge is then used as the basis for ideation whereby one or more plausible solutions are developed (I).

Stage III. This stage is called *Optimization*, and involves Apprehension by Thinking and Utilization for Evaluation. In this stage the conceptualizations of stage II are critiqued (T) against real world constraints in order to identify practical difficulties. Alternatives are systematically examined in order to select (E) an optimal plan for implementing the solution that can be executed with existing resources.

Stage IV**.** The fourth stage, *Implementation,* completes the creative process, and involves Apprehension by Experiencing and Utilization for Evaluation. Creative activity in this stage consists of experimenting with the new solution (X), evaluating the outcomes (E), and making adjustments if necessary to successfully implement them.

Innovation Styles in Organizational Structures

Research exploring the relationship of social networks with innovative thinking has primarily taken a structuralist approach, emphasizing the importance of having diverse, unique knowledge accessible through social networks. In other words, "'good' ideas are the result of having non-redundant, heterogeneous contacts that enable a person to generate ideas by combining diverse information (Kijkuit & van den Ende, 2007, p. 866).

Two distinct structural approaches have developed to explain how social network structure affects the creativity of those in the network. One is structural holes theory (Burt, 1992) which posits that social networks with non-redundant contacts and weak linkages between some members offers individuals who are central in the network with unique information and the ability to control the dissemination of the information to others in the network. As a result, the focal individual is more likely to have 'good', creative ideas (Burt, 2004). The second approach shares with structural holes theory the importance of access to unique information, but differs in

terms of controlling the flow of it. Whereas structural holes theory advocates adopting an 'information broker' mentality, the second approach advocates that members adopt an "information facilitator" perspective (Obstfeld, 2005). Obstfeld (2005) found support for this approach, in that individuals who shared information with others and facilitated connections between third parties were more involved in innovation activities.

Empirical research (Basadur et al., 2014) has identified organizational occupational differences that are consistent with the dynamic flow of the four stage innovation process and raised the possibility that organizational members may be located in different places in the organizational network due to their occupations. Typically ideas for new products to meet emerging customer needs and problems originate in the marketing department, which contains a high proportion of generators. Market research and design departments then articulate the product more clearly, and assess its market potential. These occupations contain a high proportion of conceptualizers. Next, engineers develop prototypes for field-testing with consumers and establish optimal specifications. People in engineering departments contain a high proportion of optimizers. Finally, the production department manufactures products for logistics to distribute and sales to sell. These three occupations contain a high proportion of implementers.

Occupations that require people to initiate change, recognize opportunities and new possibilities, start projects, and work with people in unstructured situations contain a relatively high proportion of generator (quadrant I dominant) individuals. Typical occupations here are the artistic and academic professions, training and teaching, and marketing. Similarly, fields such as strategic planning and research and development in which it is important to define problems, understand situations, and create direction and strategy contain a relatively high proportion of conceptualizers (quadrant II dominant). Quadrant II activity typifies fields such as market research, organization development, strategic planning, R&D scientist, university professor/researcher and senior systems consultant. Quadrant III (optimizer) activities involve solving problems with precision, and evaluating and optimizing products and procedures and are characteristic of fields such as engineering/engineering design, IT systems development, finance, and accounting. Quadrant IV (implementer) fields emphasize shorter-term implementation work, such as sales, manufacturing production, secretarial or administrative support, and project management.

Note that such traditional organizational structures prevent mingling of knowledge bases and innovation styles. Employees operate in "silos" and are restricted from collaborating with others. Research has shown that collaboration is the key driver of innovation. In the next section, we show how Social Network theory attempts to reverse this innovation bottleneck.

Innovation Using Social Networks

The origins of relating social networks and innovation began with Brass (1995) who reflected on his real-world experience that interactions with his weak tie fellow professors helped him come up with the concept that there was a relationship between social networks and creativity that was worth exploring. Even though he knew very little about creativity research, the novel inputs he received from his weak tie peers who were more expert in creativity research made him able to contribute to its study by applying his own area of expertise to it. Some authors have introduced the idea that social networks, and in particular those with an abundance of weaker interpersonal relationships (weak ties), may influence innovative activity by introducing

information or ideas which are new or novel to an individual interested in producing innovative work (e.g. Perry-Smith & Shalley, 2003).

Our work builds upon previous conceptualizations of how social networks with an abundance of weak links may influence creativity in organizations. We believe that the two notions that (1) the unique, diverse information available in one's social network is essential for innovation, and (2) cognitive skills are also required to appreciate, accept and integrate the information into innovative solutions – fit neatly into the first two stages (Generation and Conceptualization) of an established four stage innovation process. Second, we define domain-relevant knowledge and innovation -relevant skills and suggest how each serves to enhance innovation. We show how innovation performance is further enhanced when these skills are applied to diverse and unique knowledge. Third, we integrate social networks research and theory with our innovation process and related process skills to describe how social interactions drive innovative output in organizations.

Regardless of which structural approach is taken, the prevailing view of researchers looking at creativity in organizations appears to be that organizational creativity is a process of creating new connections between people and the ideas and resources they carry, so as to produce novel solutions (Obstfeld, 2005, p. 100), and this reflects the major argument of Brass' 1995 essay. He extended this notion to propose that social interaction, especially weak links, provides the novel input for innovative thinking in organizations. This starting point conceptualization has served as the basis for a growing area of influential research (Brass, 2004; Perry-Smith, 2006; Perry-Smith & Shalley, 2003). Organizations have revised their structures to create more opportunities for mingling of employees of diverse backgrounds and jobs to cause "accidents to happen" more frequently.

We believe that providing a greater abundance of weaker relationships (weak ties) *structurally* can influence innovation by introducing information or ideas which are new or novel to individuals interested in producing creative work. However, we also wish to share how a *non-structural* strategy using cognitive innovative thinking process skills can also be important, not only for facilitating a quicker and more efficient discovery of novel inputs, but also for integrating new information from weak ties into 'the big picture' of a particular situation to successfully implement new ideas and solutions. We integrate social networks research and theory with a cognitive process of innovation to describe how social interactions can drive innovation in organizations. This is a kind of dual factor approach. The primary purpose of this paper is to show how the use of a well-researched process of innovation including employees diverse innovation styles as a model, can speed up the novel inputs provided by the weak links in social networks, and can be integrated into an organizational innovation process which guarantees a continuous flow of implemented new innovations.

Innovation as a Process and Social Network Research

The Innovation approach described as crucial by Brass (1995) can best be categorized as a process approach. While Brass does not conceptualize or outline a complete innovation process, it can be argued that the 'strength of weak ties' in social networks is as valuable for problem finding as it is for problem solving. We conducted a literature search to find other instances where a creativity process approach was employed and our search uncovered one theoretical article that utilized a process approach to explain the influence of social networks on creativity (Kikjuit & van den Ende, 2007). However, they do not employ an innovation process, but rather a new product development (Stage-Gate) process to illustrate their framework. As

such, the process they describe is not a complete process, as it does not begin with any problem finding activity. Instead, the problem has already been identified, and this difference between their process model and ours is significant. Kikjuit and van den Ende argue that it is the individual's initial identification of an opportunity or idea that drives his or her subsequent interactions with others in the social network, or, in their words "that the network is created around the idea" (Kijkuit & van den Ende, 2007).

Our position, in contrast, is that social networks, especially those with structural holes and weak ties, provide the novel inputs (new information) that, when combined with the individual's skill in problem sensitivity, result in the identification of new, ill-defined problems and opportunities which is the first stage of a complete creative problem solving process. In other words, who the focal individual interacts with, combined with the focal's problem sensitivity, drives the identification of problems and opportunities through exposure to diverse and novel points of view provided by those in his or her social network. It is our opinion that our position fits Brass's conceptualization better than does Kikjuit and van den Ende's (2007) framework.

Cognitive Innovation Relevant Skills

Earlier in the discussion around Figure 2 (see p. 11), we introduced two ways of gaining knowledge and two ways of using knowledge (however gained) to create various options, possibilities, points of view and (Ideation,) and using knowledge to judge and select options (Evaluation). We conceive these poles as corresponding respectively to Guilford's (1967) divergent production and evaluation. All individuals are able to utilize their knowledge, however gained, in both ways, but tend to prefer one or the other. Basadur and Gelade (2006) demonstrated that innovative organizations are those which build strengths in each of the bipolar dimensions and each of the four stages of the process in Figure 2 (see p. 11). They realize that both dimensions are vital, nurture the dynamic tension between the polar opposites on each dimension, and acknowledge the importance of each stage of the innovation process including action.

Similarly Basadur and Goldsby (2016) portrayed innovative results as a function of Knowledge, Ideation, Evaluation and Action. Perry-Smith (2006) found that weak ties facilitate creativity, offering support for the argument that access to unique, diverse information and ideas through one's social network can increase one's innovative performance. We offer our own broad definition in order to clarify what is meant by creativity-relevant skills, based on Guilford's Structure of Intellect (SOI) model (Guilford & Hoepfner, 1971) and the work of Alex Osborn (1963): Creativity-relevant skills include *active divergence*, the generation of multiple alternatives based on given information; *evaluation*, to compare alternatives and make judgments based on relevant criteria; and *deferral of judgment*, to refrain from evaluation during active divergence. Additionally, active divergence can be viewed as comprising two sub-constructs: *preference for ideation*, and the *low tendency for premature critical evaluation of ideas* (Basadur & Finkbeiner, 1985). Skill in active divergence means having a strong preference for ideation and a low tendency for prematurely evaluating ideas.

Based on this clear definition of creativity-relevant skills it becomes evident that while access to unique, diverse information aids an individual's necessary *content* knowledge, it does not enhance the necessary *process* creativity-relevant skills. These skills enable an individual to achieve new insights and recognize new possibilities based on his or her existing domain-

relevant knowledge, and then to determine which alternative is the strongest option, or which ones are the critical few options to select.

Thus, the unique, diverse information aids individual innovation in two ways: First, it offers diverse points-of-view on a particular problem or situation, enabling an individual to understand it in new ways. This additive approach has been the dominant view of how social networks impact creativity. The second view, in contrast, is a multiplicative approach. The new, unique domain-relevant knowledge can be acted upon cognitively through the application of active divergence to create multiple alternative understandings of the situation, limited only by one's imaginative skills.

Propositions at The Individual Level

These innovation-relevant skills are applied in each stage of the multi-stage innovation process described earlier, and together form our position of how "the social connections between people, and the ideas and resources they carry (Obstfeld, 2005, p. 100)", result in increased innovative performance. As described earlier, individuals with a preference for the first stage of the innovation process, Generators, prefer to gain knowledge through direct experience and to use their knowledge for divergence. Although social networks are certainly not the only source of organizational creativity, it is our view that Generators in organizations are the most likely to be looking for and importing the novel inputs that Brass argues that social networks provide (Brass, 1995). Their preference for divergence includes having a strong preference for ideation and a low tendency to prematurely evaluate ideas. Generators proactively seek out new problems and opportunities, and this entails them talking with different people and sharing ideas without the tendency to evaluate the contributions of others (Basadur & Gelade, 2005). We propose that these preferences and behaviors result in Generators occupying positions at or near the center of creative social networks.

Proposition 1a: Individuals with a high preference for stage one, Generator, occupy central positions in creative social networks during the initial stage of the innovation process due to the greater importance of gaining knowledge via direct experience and for using knowledge to generate options.

Proposition 1b: Individuals with a high preference for stage one, Generator, have more weak ties than individuals with preferences for the other three stages.

Individuals who prefer stage two of the innovation process, Conceptualizers, prefer to learn through detached abstract reasoning and use their knowledge for ideation, they typically are the ones who integrate the develop the big picture vision of situations and develop creative solutions that may address them. It is the Conceptualizers who cognitively integrate information so as to arrive at a creative solution. It is our position that they are considered by Generators as valuable colleagues to engage in order to make sense of the diverse information they have collected from others. Additionally, we posit that Conceptualizers are regarded as "creative people" and valuable participants in idea generation, or brainstorming, sessions.

Proposition 2a: Individuals with a high preference for stage two, Conceptualizer, occupy central positions in creative social networks during the second stage of the innovation process due to their strengths in developing understanding and patiently considering, and generating options.

Proposition 2b: Individuals with a high preference for stage two, Conceptualizer, have more strong and weak ties than individuals with preferences for stage III, Optimizer, but not the Generator or Implementer stages.

The third stage of the innovation process is associated with individuals who prefer to learn through detached abstract reasoning and use their knowledge for evaluation, the Optimizers. Optimizers are individuals who excel at turning abstract ideas into practical solutions and plans (Basadur & Gelade, 2005). Their strong logical and analytical skills likely are most effective, and therefore valued, "in the middle to later phases of creative problem solving" (Basadur et al., 1990). Therefore, individuals with a preference for Optimizer stage of the creative process likely are considered central in the social network when ideas are being critically evaluated and strong, practical action plans are being developed.

Proposition 3a: Individuals with a high preference for stage three, Optimizer, occupy more central positions in creative social networks only during the third stage of the innovation process due to their strengths in evaluating options and developing practical plans.

Due to their natural preferences for analysis and critical evaluation, however, Optimizers are considered to be more comfortable with numbers and data than with people. Based on this, optimizers are likely to be the individuals with the fewest weak ties. We also predict that they have the fewest strong ties as well in creativity-focused social networks.

Proposition 3b: Individuals with a high preference for stage three, Optimizer, have the fewest strong ties and weak ties compared to individuals with preferences for the other three stages.

Finally, those individuals who prefer stage four, implementation, are individuals who like to get directly involved and will experiment until a satisfactory result is achieved. They will try to do things one way, and if it does not work, they try another. Implementers like to work with other people in order to 'finish off' projects and will persist until they succeed, which can lead to them being perceived as 'pushy' (Basadur et al., 1990). Their preference for learning through direct experience and their drive to complete implementation likely leads them to interact with a variety of different people and therefore develop an abundance of weak and strong ties.

Proposition 4a: Individuals with a high preference for stage four, Implementer, occupy central positions in innovative social networks during the final stage of

the creative problem solving process due to their strengths in gaining acceptance from others and doing whatever it takes to get solutions implemented.

Proposition 4b: Individuals with a high preference for stage four, Implementer, have more strong ties than individuals with preferences for the other three stages.

However, we do not conceive of Implementers developing as great a number of weak ties as do Generators. We base our view on the different motives of the two styles: Generators are interested in learning as much as they can and so seek out information from all possibly relevant sources. Implementers, in contrast, most likely tend to seek out only those who can help them achieve their goals of putting plans into action, and so only concentrate their social efforts on those who can help them implement solutions.

Proposition 4c: Individuals with a high preference for stage four, Implementer, have more weak ties than individuals with preferences for Conceptualizer and Optimizer, but not Generator.

Finally, it is our position that Implementers are likely considered to be the most associated with creative performance of the different stage preferences. We believe that this is because Implementers are active towards the end of the innovation process and therefore are much more highly visible than are the others. Furthermore, the tendency for Implementers to succeed due to trial and error also tends to increase their visibility. Contrary to this, we predict that Generators are considered the least associated with innovative performance because they are typically the farthest away from the successful implementation of a creative solution.

Proposition 5a: Individuals with a high preference for stage four, Implementer, are considered as being the most responsible – compared to those preferring the other three stages – for innovative outcomes by others in the social network, and by supervisors.

In contrast, we believe that Generators' centrality exists primarily during the first two stages of the innovation process, generation and into conceptualization, because their preferences for initiating and getting things started and their lack of interest in the later stages of optimization and implementation of solutions. Conceptually, as a solution is being finalized for implementation, Generators have little interest in the details of executing implementation plans; rather, they are engaged in sensing and discovering new problems and opportunities the new solution will create. Consequently, we would expect that in the implementation stage of the innovation process Generators are considered to have little involvement in the creative outcome they helped initiate.

Proposition 5b: Individuals with a high preference for stage one, Generator, are considered the least responsible – compared to those preferring the other three stages – for creative outcomes by others in the social network and by superiors.

Propositions at the Team and Organizational Levels

Teams also need to build cognitive skills in synchronizing their different styles throughout the four stage innovation process. There is an opportunity for organizational leaders to model and use the four stage innovation process as a blueprint for getting the organization to cycle through of all four stages as a consistent organization-wide business innovation process, just as they have standardized other business processes. One of the most discussed impediments to innovation in organizations is the so-called silo effect. Many organizations lack the ability to move projects horizontally across the different departments from beginning to implementation (Basadur, Potworowski, Pollice, & Fedorwicz, 2001), partly because they lack a process for doing so.

We also see implications with respect to interdisciplinary team performance and human resource management. Interdisciplinary teamwork is an important topic in the management literature especially that concerning innovation, continuous improvement, employee engagement, and complex problem solving (e.g. Hauschildt, 2001). Often teamwork is frustrating and even dysfunctional. First, if teams are not created with an appropriate mix of styles, their performance may suffer (Basadur and Head, 2001). Second, heterogeneity is often an inherent characteristic of cross-functional teams, as people in various occupations favor different process styles. We suggest that lack of awareness and understanding of the different styles among team members may be a significant source of difficulty. If team members understand their own innovative styles and thus their personal preferences for different stages of a multi-stage innovation process, this can increase their sensitivity to, patience with, and appreciation of the value of their teammates' different styles and improve the quality of their interactions and their team problem solving performance (see e.g., Basadur, 1995; Basadur & Gelade, 2005). Then, rather than endure frustration in working with team members' different and even opposing cognitive styles, they can build skills in synchronizing these different preferences for the stages of the innovation process and more efficiently and collaboratively work their way through the complete process through to successful implementation of change. If the four stage process of innovation outlined above adequately represents the innovation process, it would be expected that teams with a heterogeneous mix of preferred innovation styles would significantly outperform teams with a homogeneous mix of styles in innovative work. In the former case, all stages of the process are readily available within the team. One could also predict that members of homogeneous teams would experience more satisfaction working with like-minded teammates.

Therefore we suggest the following additional propositions as sample starting points into future research in these fields:

Proposition 6: Organizational teams trained to understand and appreciate Innovation Profile style differences will report increased interdepartmental collaboration compared to untrained teams and organizations.

Proposition7: Organizations and teams trained to understand and appreciate Innovation Profile style differences will more speedily and efficiently develop and implement higher quality innovation solutions across departments compared to untrained teams and organizations.

Proposition 8: Organizations and teams trained in innovation Profile cognitive process style diversity will report higher member job satisfaction.

Proposition 9: Members of organizations and teams who are trained to understand the four styles of the innovation process represented by the Basadur Profile will value diversity within their organization more than will members of untrained organizations.

Conclusion

Dan Brass' seminal paper on the influence of social networks on creativity outlined how the social and contextual aspects of creativity research can be integrated with research on creativity as an individual characteristic with tremendous potential explanatory power. Unfortunately most, if not all, researchers who cite his work have either ignored or failed to adequately conceptualize his position on how these areas of creativity study intersect. What has resulted is an overwhelming focus on structure to explain how social networks influence creativity. This has led to the neglect of the important role individual characteristics like domain-relevant knowledge and creativity-relevant skills play in organizational innovation. In this paper, we have returned to Brass' essay to revive his arguments and also to build upon them. We have described how the unique pieces of information and ideas available through one's social network, and the cognitive skills to appreciate and internalize this informational diversity, fits well with the process approach to innovation. Further, we have taken Brass' conceptualization further by proposing how social networks influence innovation in organizations via optimizing creative solutions and then implementing them. Brass identified two of the foundational creativity-relevant skills, active divergence and deferral of judgment, and we have identified and introduced a second skill, evaluation, which plays a crucial role in ensuring creative solutions generated during the ideational stages are actually implemented. Finally, we introduced propositions that could be used to test our ideas and drive future research in the field.

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