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Analyzing The Dynamics of Social Networks by Combining Psychometric Measures with Social Network Analysis

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ANALYZING THE DYNAMICS OF SOCIAL NETWORKS BY COMBINING PSYCHOMETRIC MEASURES WITH SOCIAL NETWORK ANALYSIS

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ABSTRACT

An effective social network is built on "social relationships," fostered by increasing "reliance" on another person to complete tasks (within required parameters) because he or she has delivered reliably in the past; and "trust"— an emotional, interpersonal connection that grows out of repeated reliance, based on testing/consulting with another individual over time. "Reliance" and "trust" foster high levels of "collaboration," an essential ingredient for creating high performing teams. Developing teams that have shared values and trust among the participants is important as the teams engage in information transfer, knowledge exchange, and finally knowledge sharing, leading to full "social network engagement."

To date, there has been an absence of quantitative data to support some of the hypotheses in the SNA literature that attempt to explain the "dynamics" of a social network: "why" information flows more, or less, readily between and among specific individuals in a social network. In this paper, we combine the SNA which describes the "mechanics" of a social network in an engineering/architecture firm with data, gathered using a psychometric instrument, The Birkman Method, to quantify the behavioral and personality characteristics of individuals in that firm—the dynamics" that drive the mechanics. Our focus is on identifying and measuring specific characteristics that engender reliance, trust, and collaboration.

We find that the quantitative measures of behavioral and personality characteristics help explain the interactions of highly networked individuals in a social network, or, conversely, of individuals who have low levels of network engagement. From a management perspective, SNA coupled with psychometric data can potentially provide insights about the personality and behavioral characteristics of individuals that managers need to identify, work with, and reward as they build high-performing, highly-networked teams.

KEYWORDS

Social Network Analysis, Personality Analysis, Organization Behavior

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INTRODUCTION

Professional service firms, particularly engineering and architecture firms, are in the business of developing and managing large, complex, multi-year projects. They hire staff from a range of subject areas and technical disciplines to conceptualize, design, manage, and execute the work. Such firms rely on teams and close team coordination as these types of projects usually require that staff interact closely with one another in the project phases and solve complex problems as they arise. The social and professional relationships including communications between individuals are referred to as social networks.

In addition to traditional collocated scenarios, projects and their associated teams are becoming increasingly virtual (e.g., telework, teleconferencing). Work interactions are increasingly conducted through portals, intranets and apps, in addition to face-to-face. Given these changes, it is increasingly challenging to develop and sustain "high-performing" teams that communicate effectively (i.e., focusing on the human factors that drive successful interactions) both within their team and with staff in other teams, rather than focusing entirely on "high-functioning" project teams that focus on working efficiently (i.e., being output driven) to complete projects.

In this paper, we use Social Network Analysis (SNA) to present a case study of an engineering/architecture firm and their challenge to maintain a focus on high-performing project teams. SNA describes the "mechanics" and the topology of the communications flows between individuals and their social-network connections. It captures the frequency and types of communications that are made: the "how" and "what." By surveying and gathering quantitative data from individuals on their "communications frequency," "information transfer," and "knowledge exchange," SNA visually identifies those individuals, who are bottlenecks in the mechanics of the social network (i.e., information does not flow out from them at the same rate it flows in to them). Similarly, it can identify "highly connected," or "networked," individuals, who engage actively in the mechanics of the social network (i.e., information flows out from them at the same, or higher rate, than it flows into them). These "highly connected," or "networked," individuals are described as having high levels of "network engagement." They play an important role in both high-functioning and high-performing teams. To deepen our understanding of the social dynamics driving the mechanics in this firm, we gathered and analyzed quantitative data on staff in the firm drawn from a psychometric instrument. We identify and discuss the organizational focus, work-related interests and disinterests, work styles, and the behavioral and personality characteristics that foster reliance, trust and collaboration (RT&C) and lead to social network engagement.

Chinowsky et al. (2008) argue that understanding and improving social network engagement requires analyzing the "social dynamics" that describe "who" and "why" specific individuals are (much) more/less socially engaged in the "mechanics" of the social network. To understand the impact that the dynamics has on the mechanics of a social network, Chinowsky and coauthors underscore the importance of "developing

teams that have shared values and trust among the participants, "as they engage in information transfer, knowledge exchange, and finally knowledge sharing, leading to full social network engagement."
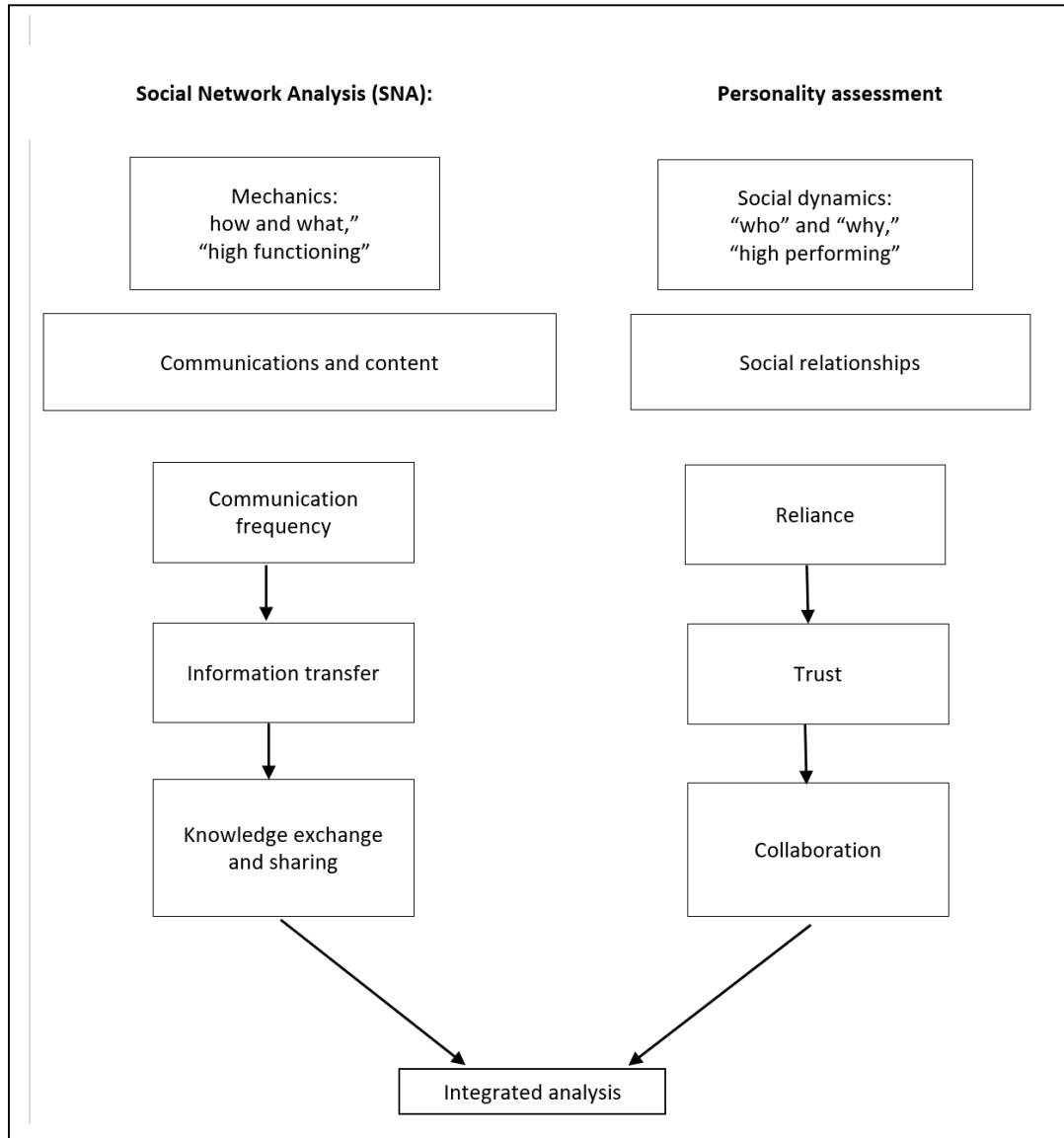

Figure 1: Integrated Assessment of social network engagement

Chinowsky et al. (2010) emphasize that an effective social network is built on "social relationships," fostered by (1) increasing "reliance" on another person to complete tasks (within required parameters) because he or she has delivered reliably in the past; and (2) "trust," a durable, interpersonal connection based on a history of reliability, shared values and other personality characteristics. They argue that high levels of "reliance" and "trust," are important for creating high-performing teams that

are not just efficient but are also effective, and for understanding how effective "collaboration" is achieved.[4]

The relationship between using SNA to quantify the mechanics and using personality assessment tools to quantify the social dynamics is shown schematically in Figure 1. The left-hand side of the flow chart shows the mechanics of SNA – the characteristics of the "how" and "what" of communications transmission. The right-hand side describes the social dynamics that motivate and foster network engagement – the "who" and "why," which build reliance and trust, and lead, in turn, to collaboration (RT&C).

Our hypothesis is that behavioral and personality characteristics that lead to this collaboration can be identified, measured, and associated with specific individuals (i.e., the nodes in the network) who are in key positions in a social network. The underlying methodological question is whether, and to what extent, behavioral and personality characteristics identified using psychometric instruments can help explain the interactions of highly networked individuals in a social network, or, conversely, of individuals who have low levels of network engagement. SNA, coupled with psychometric data, can potentially provide management and team members with insights about the personality and behavioral characteristics of the individuals they need to identify, work with, and reward as they work to build high-performing, highly-networked teams.

METHODOLOGY

The case study in this effort is an engineering/architecture firm, which we call EngArc. It has been the subject of a three-phase SNA study conducted by Chinowsky and others between 2008 and 2012. We combine psychometric data on the variables that drive the dynamics of the social network at EngArc with SNA data that are descriptive of the mechanics of the social network. We surveyed twenty-five engineers/architects at EngArc who volunteered to complete The Birkman Method questionnaire. The Birkman provides quantitative data for individuals on the intensity of underlying motivations, as well as other key variables.

EngArc provides full-service design services, with a focus on engineering/architectural services. Through expansion and mergers, EngArc now has nine offices with headquarters in the Northeast United States and regional offices throughout the eastern United States. EngArc is organized along traditional areas of specialty that include site, highway, water, and surveying services, as well as architectural and retail facility programming services. The company has used this format since its inception over two decades ago. It has been consistently profitable and continues to expand. However, as EngArc expands and increases staff size, issues of trust, unequal internal performance, and confusion regarding roles and responsibilities at EngArc are expanding. This situation motivated an SNA study in 2008, which included the organization's 43 professional personnel. The 2008 study was followed by a second study in 2010 and a third study, after a period of rapid

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[4] See also Pryke and Smythe 2006; DiMarco and Taylor 2011.

growth, in 2012. The third study covered an expanded group of 69 personnel, including the 46, who participated in the 2010 study.

After the conclusion of the third SNA study, 25 of the 69 professional staff in the firm agreed to complete The Birkman Method questionnaire to deepen the SNA analysis. The SNA data was then compared to the Birkman psychometric data to identify a number of characteristics that individuals in the firm share and which, when considered as a whole, describe the culture of the firm. Additionally, the specific behaviors and personality characteristics of three managers who play significant roles in the social network of the firm were analyzed to explain why they were each more/less connected in the network.

In the next section, we provide a summary analysis of the SNA of the mechanics of the social network at EngArc. We then describe the Birkman instrument and identify the specific behavioral and personality characteristics that foster RT&C between and among the professional staff at EngArc. Finally, we present a more detailed analysis of the behavioral and personality characteristics of the three managers to explain why they are more/less engaged in the EngArc social network. We conclude with a brief evaluation of the benefits of complementing SNA with analysis using psychometric data.

SOCIAL NETWORK ANALYSIS

The Social Network Analysis (SNA) methodology adopted in the three studies of the EngArc company used an electronic, web-based survey which asks questions that map to the levels in the Social Network Model. The intent was to obtain data that corresponded to the perspectives of each individual in regards to all areas of the model. The survey results were analyzed using the UCINET Social Network Analysis software (Hanneman and Riddle 2005). The UCINET software provides quantitative measurements and graphical representations required for the organization analysis. The analysis focused on four key measurements:

Network "density" indicates the amount of interaction that exists between network members. Density reflects the number of actual links that exist between members in comparison to the number of potential links that exist if all members were connected through relationship links.

"Centrality" measures the distribution of relationships through the network. In a highly centralized network, a small percentage of the members will have a high percentage of relationships with other members in the network. In contrast, a network with low centrality will have relatively equal distribution of relationships through the network. A dense social network with low centrality is described as "hub and cluster." Connections between groups of individuals cluster and form a hub with multiple connections, as do other hubs.

"Power" works in conjunction with centrality. Centrality measures the total number of relationships that an individual may have, while power reflects the

influence of an individual in the network. Individuals who are giving information to others in the network, who are in turn passing along that information to others, have a high degree of influence or power.

"Betweenness" measures the amount of information that is routed through an individual to distribute to the team. This rating indicates which individuals are involved in discussions that are occurring within the network.

SNA STUDY OF THE ENGARC COMPANY

The SNA study of EngArc provides a longitudinal view of the organization over a five-year period. After the first two phases of the study, the investigators reviewed the results with senior management staff to recommend areas that could use attention in terms of enhancing communication and knowledge flows in the organization. Managers used the data, and the results of this process are an evolution of changes in the organization in terms of both communication and knowledge topographies in the networks, as reflected in the third phase.

Figures 2a -2c illustrate the evolution of the communications patterns in EngArc over the course of the study. As illustrated, the first network analysis found EngArc to be an organization with a core group of managers with a high level of connectedness and centrality in terms of weekly communications. At the same time, a second group of individuals formed the periphery of the communications topography. This two-level communications mapping created an imbalance within the organization, with individuals having the perspective that a small group of managers controlled most communications within the organization.

The results of this analysis were shared with the organization with a recommendation to reduce the centrality by increasing the involvement of managers throughout the organization in the decision-making processes. The follow-up to this initial analysis provided the communications map illustrated in Figure 2b. As illustrated, the organization began to change the topology into a hybrid network, combining both central elements as well as clusters. The clusters emerged after the first phase and reflect efforts to enhance communications to each of the specialty areas. However, the topology still contained artifacts of centralization, as well as periphery members.

Once again, the results were shared with EngArc management with the recommendation that this transition should continue, but with the caveat that integration of the periphery was a critical element for long-term success. The final phase of the transition is seen in Figure 2c. In this illustration, EngArc has transitioned from a centralized organization to a hub and cluster organization. As illustrated, a few key individuals form the communications hub while several clusters have formed, each with unique communication characteristics.

Complementing the communications series of networks is the knowledge exchange series illustrated in Figures 3a – 3c. The first knowledge exchange network illustrated in Figure 3a mirrors the first phase communication network by once again

showing a centralized organization. However, amplifying the communication network centralization, the knowledge exchange network illustrates a small core of EngArc individuals serving as the knowledge transfer points for the network. In contrast to the
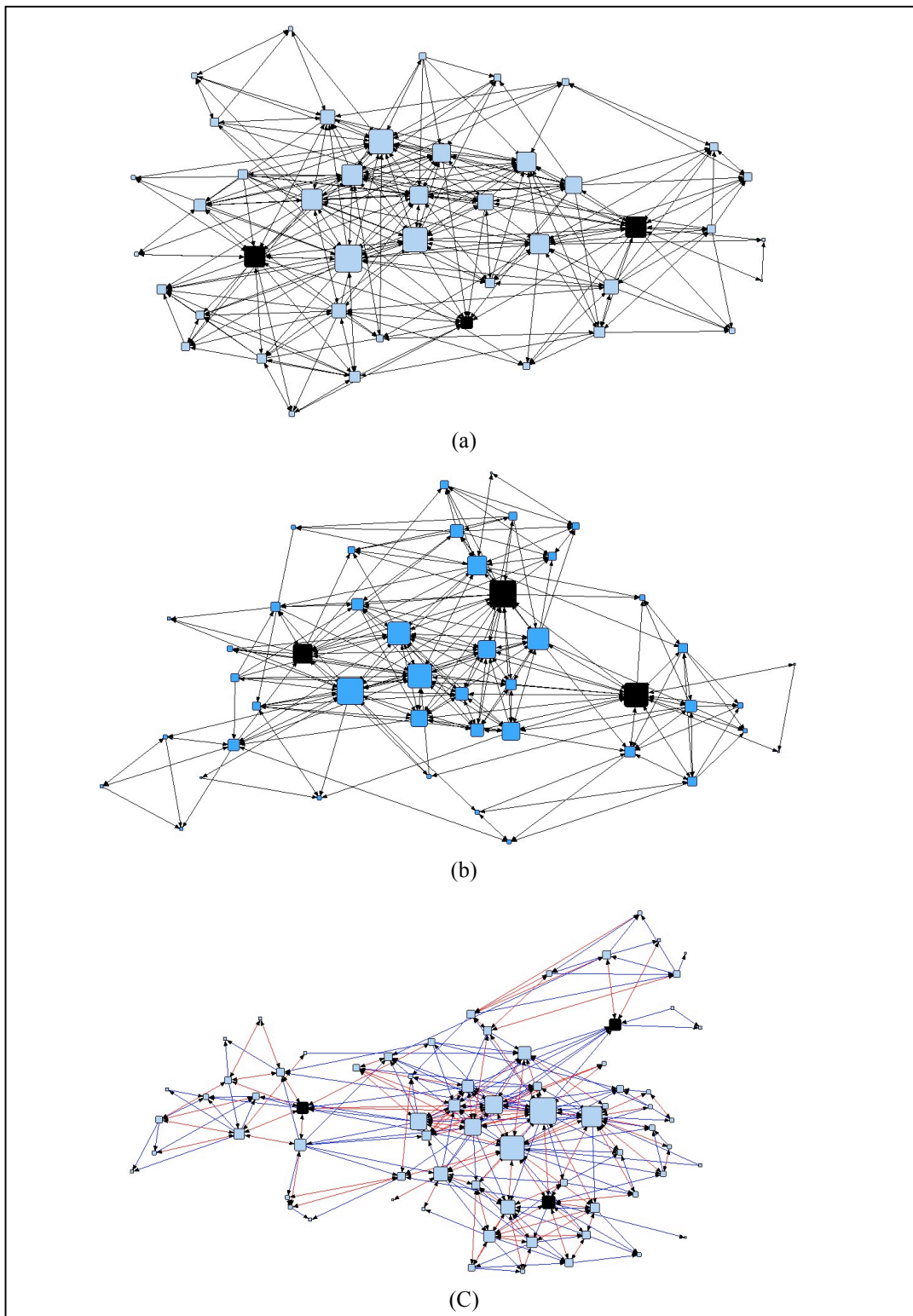

(a)

(b)

(C)

Figure 2 (a-c): Evolution of communication networks through three phases of the EngArc study.
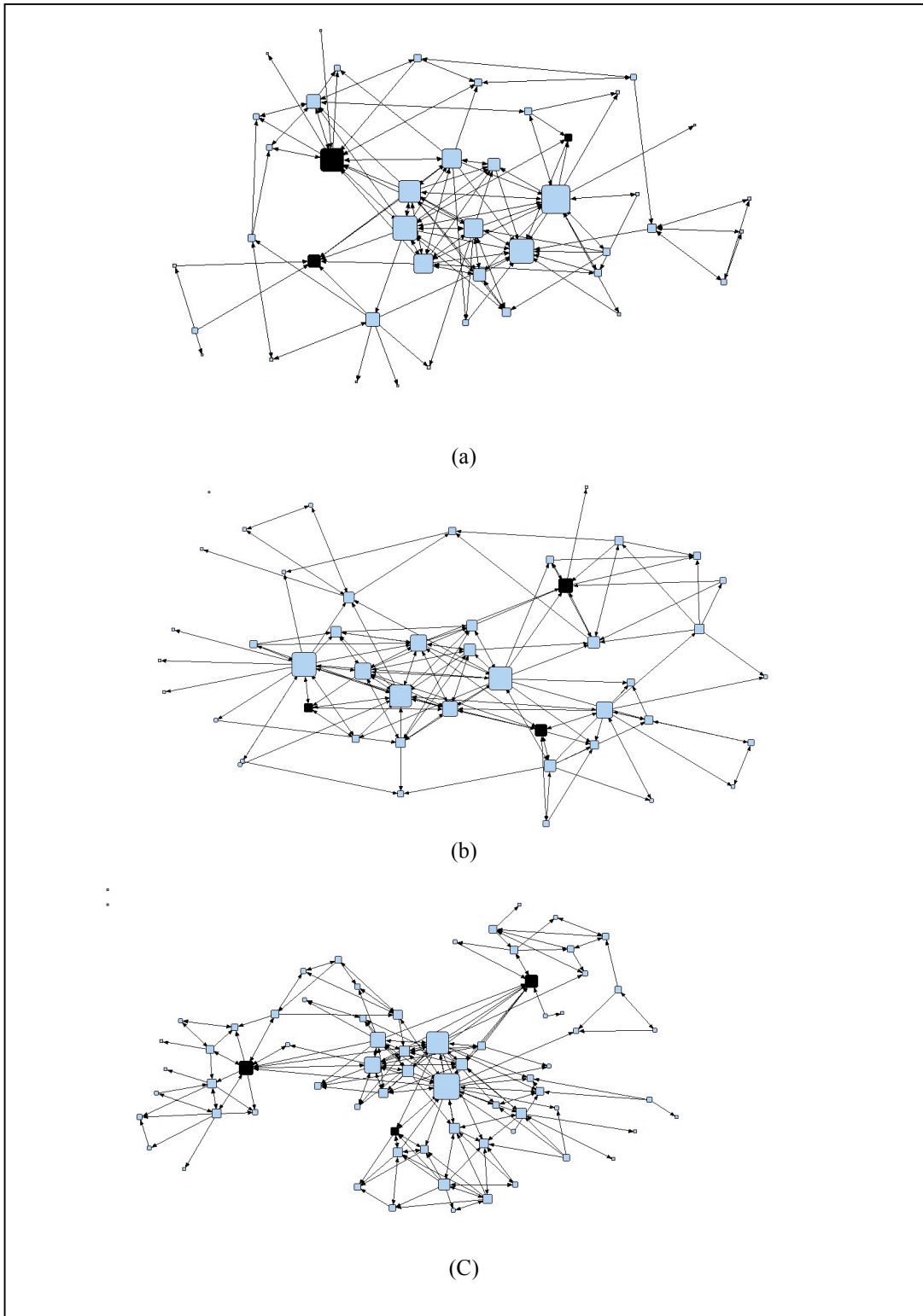
(a)

(b)

(C)

Figure 3 (a-c): Evolution of knowledge exchange networks through three phases of the EngArc study.

communications network, the knowledge network displays fewer connections along the periphery of the network. As with the results of the communications network analysis, this result was conveyed to the EngArc organization.

Similar to the communications adjustment, the EngArc organization adjusted the knowledge network topography with the results illustrated in Figure 3b. In this second analysis, the knowledge network is seen as a diffuse network with a few distinguishing characteristics. The organization has some centrality, but also has some elements of clustering. The minimal number of connections which exist in the network result in a topology that is indistinct and requires additional density to be effective. Finally, Figure 3c illustrates the results of the latest analysis of the knowledge network. The change in topology can be seen with EngArc moving distinctly to a hub and cluster topology.

NETWORK QUESTIONS OF INTEREST

The move to the hub and cluster topology created a second question for the research team, "Do the clusters behave differently in terms of their communications and knowledge exchanges and why?" The initial answer to this question can be seen in Figures 2c and 3c, the communication and knowledge exchange diagrams respectively. Figure 3c provides the clearest indication of how the network characteristics differ between the three clusters.

As illustrated, the manager responsible for each cluster is highlighted in black. Cluster 1 on the upper right of the network is characterized by both the gatekeeping of information by the manager and the minimal number of connections between the members in the cluster. As illustrated, the links between the cluster and the rest of the network all flow through the manager which places the manager in the position of determining what knowledge moves through to the team members. Similarly, the members of the cluster have minimal knowledge transfer interactions, resulting in a focus on independent efforts.

Cluster 2, on the left side of the network diagram, has similarities to Cluster 1, but is differentiated in the gatekeeping function. Cluster 2 has a similar sparseness in terms of collaboration within the network. However, the knowledge exchange with the rest of the organization expands to a secondary link, reducing the gatekeeper role of the manager. Overall, Cluster 2 operates in a similar manner to Cluster 1.

In contrast to these two clusters, Cluster 3 at the bottom of the network demonstrates a very integrated approach to communications and knowledge exchange. As illustrated, the individual members in the cluster are highly networked and there are a number of exchange points between the cluster and the overall network. Additionally, the size of the manager node is smaller in this cluster indicating that the manager is not as central to communications as in the other two clusters. These differences result in Cluster 3 having the characteristics of a team that is collaborating which is the goal of the high performing organization, rather than working independently which is the indication in Clusters 1 and 2.

The difference in these clusters provided the motivation for furthering the study of this organization into why these differences might exist. Since all three managers have similar responsibilities in similar domains, the job functions are not the drivers of the differences. Thus, the question of whether there are differences in the work styles of these managers motivated the second part of this effort.

THE BIRKMAN METHOD

The Birkman Method is a psychometric instrument designed specifically for use in the workplace (Birkman et al, 2008; Fink and Capparell 2013). First developed in 1951, the Birkman is widely used by both individuals and organizations in the United States and internationally to improve the performance (i.e., both efficiency and effectiveness) of individuals and teams, and also to increase personal job satisfaction.

The Birkman takes a quantitative, multi-dimensional approach to measure and describe the intensity of both behavioral and motivational issues facing individuals and teams at work (Digman 1990). It has been validated and normed using a representative sample of the U.S. workforce, U.S. Department of Labor occupation categories and labor force characteristics (gender, age, ethnicity, and industry).[5] While The Birkman Method predates the widely accepted Five Factor Model of personality by many years, it "tracks the Five Factor Model relatively closely."[6]

The Birkman is administered as a multiple-choice questionnaire and requires about thirty minutes to complete online. It is immediately scored by Birkman International—it is not self-scored. The Birkman quantifies how the intensity of an individual's unique underlying motivations, which are called Needs, and behaviors (both "Usual Behavior" and counterproductive "Stress Behavior") shape interactions with others at work. The Birkman does not measure intelligence, technical competence or skills.

BIRKMAN VARIABLES: QUANTITATIVE MEASURES

Using scales, ranging from 1 (low) to 99 (high), or 1 (low) to10 (high)), scores are presented numerically for three types of information: (1) Interests, (2) Preferred Work Styles, and (3) Usual Behaviors and (4) Needs/Stress Behaviors. Birkman describes (1), (3) and (4) together as "Components".

1. Interests—not to be confused with hobbies—are ranked in order of intensity on a scale of 1 (low) to 99 (high). High-scoring Interests drive an individual's productivity and are best described as Needs, discussed below. Low-scoring Interests can be viewed as "(dis)Interests" that take time away from high-scoring Interests and, ideally, should be avoided, or at least occupy much less of that individual's time.

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[5] Reports describing the technical features of The Birkman Method and comparisons with other psychometric instruments can be found on the Birkman website (www.Birkman.com).

[6] Private communication from Dr. H. Rad Eanes III. He also notes that "its measure of 'Needs' makes it unique."

2. Preferred Work Styles include 14 different categories under four broad headings: Management Styles, Corporate Styles, Social Styles, and Problem Solving Styles. These are measured on a scale of 1-10.
3. Usual Behaviors, report the intensity on a scale of 1-99 of an individual's socialized behaviors that are external; i.e., the social perceptions of others.
4. Needs/Stress Behaviors describe the underlying motivations that are internal to the individual. When Needs are not met, an individual may exhibit a Stress behavior, which is scored either as a 75 if the individual's Need intensifies under stress, or a 25 if the individual does the opposite of what (s)he needs to be productive.

Usual Behavior and Needs represent two important dimensions. If the intensity of a person's underlying Needs are not apparent to others because the individual's Usual Behavior masks their Needs, their Needs may not be perceived by, or met by, others which can cause that person to have a stress reaction and exhibit Stress Behavior. Stress Behaviors are always counterproductive for the individual and can have an adverse impact on those who find themselves dealing with an individual whose Usual Behaviors unpredictably deviates from their Usual Behavior.

Birkman presents quantitative information both numerically and in a bar chart describing Organizational Focus and a four-quadrant diagram called the Birkman Lifestyle Grid (the Grid). Both the bar chart and the Grid sum up an individual's characteristics using the following colors:

- Red: Operations/Technology
- Yellow: Administration/Fiscal
- Green: Sales/Marketing
- Blue: Design/Strategy

The Organizational Focus (Figure 5) arrays four types of work environments and indicates, by the length of the bars, the two work environments that are the best "fit" for individuals, using a scale of 1 (low) to 10 (high) to indicate the intensity of the "fit." and the length of the bar. The longest bar shows the dominant focus and the second longest bar shows supporting focus.

The Birkman Life Style Grid (Figure 4) plots the aggregate measures of three characteristics for each individual using the following symbols: Interests (asterisk), Usual Behaviors (diamond), and Needs/Stress (circle inside a square). The Grid has two axes. Left-to right measures "focus," ranging from task-oriented to people-oriented. The vertical axis measures "interaction style," ranging from indirect communication or introversion ("thinking") to direct communication or extraversion ("talking"). For each of the characteristics, two composite indices are generated based on values of a number of Birkman indicators used to measure the individual's position in the Grid.

THE LIFE STYLE GRID

The Life Style Grid is divided into four quadrants. Each quadrant is assigned a color that classifies the individuals whose symbol appears in that quadrant:

- Red quadrant: Expediters/Doers. Individuals who are task-oriented, decisive, direct communicators, and concerned with the present.
- Yellow quadrant: Administrators/Counters. Individuals who are task-oriented, reflective, and concerned with the past.
- Green quadrant: Sellers/Communicators. Individuals who are outgoing, people-oriented, talkers/sellers, and concerned with the present.
- Blue quadrant: Planners/Thinkers. Individuals who are people-oriented, creative, reflective, and future-oriented.
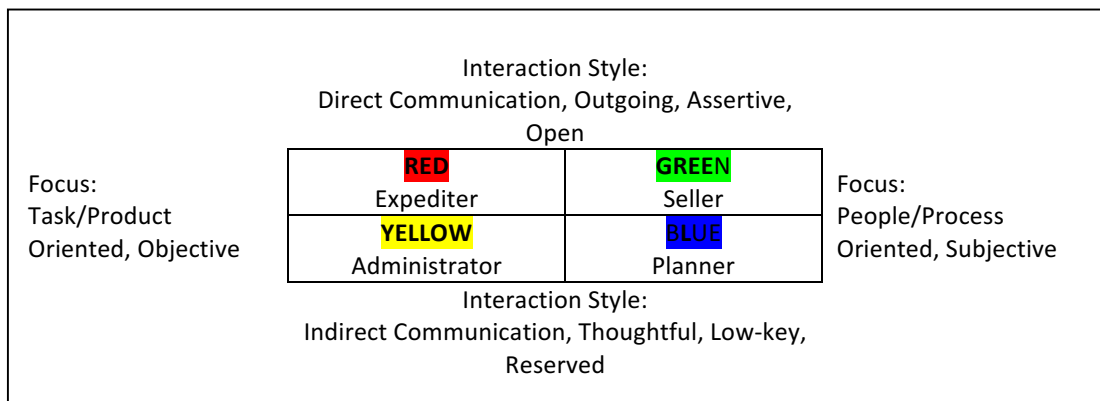

Figure 4: The Birkman Life Style Grid divides the focus and interaction into four quadrants.

An individual's Interests, Usual Behaviors, and Needs/Stress symbols may appear in up to three quadrants in the Grid. When all the symbols describing an individual appear in one quadrant, that person's Interests, Usual Behaviors, and Needs/Stress are all clustered. As a result, other people are more likely to have an accurate perception of how to support that person because the behaviors they see reflect the person's interests and needs. In contrast, for individuals whose Interests, Usual Behaviors, and Needs/Stress symbols scatter across quadrants, co-workers (and possibly the individuals themselves) may not understand what makes them productive.

For example, if an individual's Needs symbol appears in the Planner quadrant and his/her Usual Behaviors symbol appears in the Expediter quadrant, others in the organization will likely be surprised to learn that this person, who acts and looks like a task-oriented, decisive decision maker, actually needs time to think through the complexity of a problem and plan before making a decision. Pressure to make complex decisions quickly can trigger a Stress Behavior. If this person's Interests symbol appears in yet a third quadrant, that adds more complexity as the person's Interests, Usual Behaviors and Needs differ, making it even more challenging for others to understand what kind of support he/she needs to be productive.

The Grid analysis is particularly useful for providing an overview of the characteristics of the individuals in an organization, which, in turn, describe the culture of that organization. Depending on the mission of the organization, it may be entirely appropriate that staff symbols cluster in one or two quadrants. But no matter the mission, every organization needs staff in each of the four quadrants in order to cover all the attributes required in a high-functioning organization. In particular, Planners need Expediters and Communicators need Administrators, although these pairs may find it difficult to work together because their Interests, Usual Behaviors, and Needs diverge.

BIRKMAN CHARACTERISTICS AND SOCIAL NETWORK ANALYSIS

In the introduction, we identified three social relationships that have been identified in the SNA literature as especially relevant to support effective social networking: reliance, trust, and collaboration (RT&C). In this section, we discuss how the Birkman measures can be used to describe behaviors of individuals that support such social relationships, and also can be associated with their motivation to participate in social networks. Tables 1a and 1b provide a list of all the Birkman psychometric measures, with descriptions, that provide the information we use to link to the SNA analysis. The measures are organized in two broad groups: (1) Components, which include Interests, Usual Behaviors and Needs/Stress Behaviors and (2) Preferred Work Styles. As noted above, Interests, Usual Behaviors and Needs are scored on a scale of 1 (low) to 99 (high). Preferred Work Styles are scored on a scale of 1(low) to (high) 10. We classify and report the values in five broad categories: Very High (VH), High (H), Moderate (M), Low (L), and Very Low (VL). The score ranges for each of Usual Behaviors and Needs are determined by Birkman' using their normed "socialized values" for the population. All Needs are normed to 50 by Birkman. Birkman's normed scores vary for each of the Usual Behaviors.

These measures can provide information about individual behaviors and motivations that foster or inhibit the development of RT&C. In some cases, we identify behaviors and motivations that are strong facilitators or strong inhibitors. The nature of the relationships between Birkman measures and facilitating/inhibiting RT&C, and network engagement, is complex, and is shaped by the institutional environment in which the individuals operate. The "culture" of the organization matters, and might constitute a "killer inhibitor" if it is hostile to network development. On the other hand, a supportive culture might foster the evolution of RT&C and encourage network engagement. We move from a general description of the organizational environment to the specific behaviors and personality characteristics of individuals that define the dynamics of network engagement in a particular organization, in this case the EngArc social network.

Table 1a: Birkman Measures: Components and Organizational Focus

Category	Birkman characteristic	Definition
Components: Usual Behaviors and Needs		
Interpersonal	Esteem	Relating to people individually; showing appreciation and respect one-to-one: "direct" to "indirect"
	Acceptance	Relating to people in groups: "independent" to "gregarious"
	Empathy	Expressing feelings and emotions: "indifferent" to "sensitive"
Organization related	Structure	Dealing with systems, procedures and details in planning and organizing; follow-through: "adaptable" to "systematic"
	Authority	Directing and controlling: "delegative" to "directive"
	Activity	Preferred pace of action; degree of restlessness: "managed" to "energetic"
	Thought	How much time and information a person requires for decision making: "decisive" to "thorough"
	Change	How an individual handles variety, interruption and disruption: "focused" to "open"
	Freedom	Personal independence; how unconventional and spontaneous: "conventional" to "non-conventional"
Competitiveness	Advantage	Incentive preference; degree of desire for material reward and prestige: "team minded" to "competitive"
	Challenge	Demands and commitments imposed on self for achievement and overall self-worth: "maintain" to "enhance"
Color	**Components: Interests**	
Red	Mechanical	Hands-on work, with a broad range of technical responsibilities
Red	Scientific	Research-related professions or avocations
Red	Outdoor	Working in an outdoor environment
Yellow	Numerical	Working with numbers and financial data
Yellow	Clerical	Valuing systems, order, and reliability
Blue	Artistic	Creating aesthetic works; expressing ideas creatively
Blue	Literary	Enjoying reading and working with words
Blue	Musical	Enjoying or participating in musical activities
Green	Persuasive	Persuading, selling, or debating
Green	Social Service	Helping people; understanding their thoughts and feelings
Color	**Organizational Focus**	
Red	Operations/Technology	Product-focused culture, emphasis on implementation and tactics
Yellow	Admin/Fiscal	Culture focused on standards and efficient procedures and policies
Blue	Design/Strategy	Culture of ideas with focus on strategy, planning, innovation
Green	Sales/Marketing	External communications culture designed to influence others

Notes: Components and Interests are scored on a scale of 1 to 99. The low to high range for Components is described in the definitions. The Interest score ranges from a low of "extreme disinterest" to a high of "intense interest," which indicates a "need".

Table 1b: Birkman Measures: Preferred Work Styles

Preferred Work Styles		
Management styles	Knowledge Specialist	Contributes and manages through personal expertise and example
	Directive	Manages from the front; direct involvement in problem solving, controlling and implementing
	Delegative	Manages using a plan or strategy; assigns tasks to people to do the work
Corporate styles	Work Motivation	Attitude towards work; finding value in most jobs and roles
	Self Development	Attitude towards personal growth and career advancement; motivated to make contributions and exercise professional or managerial responsibility
	Corporate Adaptability	Individual and team commitment to organizational and relationship goals and initiatives needed to advance in the organization
Social styles	Social adaptability	Extends trust easily to others; attitude towards people, social situations, and legal rules; ability to withstand extended stress
	Social Responsibility	Values and supports social conventions in own social group; provides and supports stability at work, family, legal, and social relationships
Problem-Solving Styles	**Pairwise continuum**	
Public Contact/Detail	Public Contact	Focuses on people being central to organizational effectiveness
	Detail	Focuses on process as central to organizational effectiveness
Global/Linear	Global	Thinks holistically, not follow a sequential pattern
	Linear	Thinks logically and sequentially
Conceptual/Concrete	Conceptual	Thinks creatively using a mix of knowledge, intuition, and imagination
	Concrete	Analyzes factually to solve problems for immediate, visible results

Notes: Preferred Work Styles are measured on a scale of 1 to 10. Problem Solving Styles are measured pairwise on a 1 to 10 range so that the scores for the two contrasting styles in each pair sum to 11.

RELIANCE, TRUST, AND COLLABORATION (RT&C)

Reliance describes an interaction between two parties and sums up the act of acquiring enough confidence in another person, based on an accurate perception that this person is dependable and will reliably deliver on promises of help or support. Reliance usually occurs as a result of a series of dynamic interactions between two parties (i.e., a repeated game) that builds a working relationship over time. Reliance can involve a one-way relationship, or a two-way relationship. For example, party A identifies party B as a source of information, knowledge, or other kinds of technical, managerial, or interpersonal support needed for a project. Party A then contacts party B to seek help and Party B delivers help to party A. If this one-way exchange occurs consistently, party B has proven that (s)he can be relied on to help party A. Reliance can also be two-way, involving a mutually beneficial exchange, in which party A and party B rely on one another, based on their previous, productive interactions. Building

reliance can be accelerated by factoring in reputation. For example, if party A needs help and knows that party B has a reputation for being experienced and sharing reliable information or knowledge on a particular issue/topic, then party A may rely on party B because party B is a known quantity rather than testing to see if party B can be relied upon.

Over time, reliance builds trust. The length of time required to build trust varies depending on the nature of the situation and on whether the social perceptions individuals have of one another accurately reflect how they operate under stress. If individuals remain steady, consistent and predictable under stress, then they will likely be viewed by others as more reliable, more trustworthy and, as a result, they more trusted. On the other hand, if individuals become unpredictable and exhibit counterproductive behaviors under stress, they may be less relied on and trusted. Below, we identify and discuss that behavioral and personality characteristics that build/inhibit social network engagement. Being reliable and trustworthy are fluid states and vary depending on the individual and the situation. Consequently, our analysis does not associate specific characteristics with each.

Similarly, the SNA literature discusses the importance of collaboration, as a key ingredient in the social dynamics of high-functioning/high-performing teams. Collaboration is defined as two or more individuals willingly working together on an endeavor. It grows out of reliance and increasing trust.

BIRKMAN CHARACTERISTICS THAT FOSTER OR INHIBIT BUILDING RT&C

We now turn to the Birkman to identify the Preferred Work Styles and Usual Behaviors, Needs/Stress Behaviors of an individual who is perceived by others to be reliable and trustworthy—a good corporate citizen and team player. Table 2 provides score ranges for Preferred Work Styles and Usual Behaviors and Needs that would characterize such individuals, and hence support an environment of high network engagement.[7]

Table 2 presents desirable score ranges for each of 17 Birkman measures that, in our judgment, foster RT&C. We base our judgments on Birkman's formal definitions and detailed discussion of the ranges for each of the psychometric measures, as well as on our experience using the Birkman instrument. With data from more case studies and larger samples, one could do a statistical analysis of the empirical relationship between the SNA data and Birkman data that would provide more precision. With only a small sample and a single firm, the score ranges in Table 2 provide a starting point for directly associating specific SNA concepts with Birkman data.

For the six relevant Preferred Work Styles, the desirable ranges are all moderate to very high. For all the Usual Behaviors and Needs, the desirable ranges of the scores vary, reflecting their differing impact on RT&C. Individuals with scores outside the desirable ranges (i.e., either too high or too low) would tend to be seen

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[7] Two management styles (Directive and Delegative) and the three pairs of problem-solving styles are not germane for RT&C. Scores for them are included in Table 4.

less reliable or less trustworthy, and hence as not fostering, and perhaps even inhibiting, an environment that supports collaboration and network engagement. In contrast, Individuals with moderate-to-very-high scores in the six Preferred Work Styles are very likely to come across as reliable and good corporate citizens.

A Work Motivation score of 3 or above (the average white-collar worker scores three on the 1-10 scale) is especially important because it measures the extent to which an individual has a positive attitude towards work and finds value in most jobs, whether it is rewarded by the organization or not.

While the Birkman does not measure an individual's intelligence, technical competence, or skills, it does provide two measures that can be associated with competence. The first is an individual's commitment to Self Development which contributes to the perception by others that this person can be relied on as (s)he is committed to personal growth and making professional contributions. Finally, a desirable score in the Knowledge Specialist management style (i.e., leading by expertise and example), especially when combined with a similar range of score in Self Development, contributes to RT&C, particularly in knowledge-driven organizations.

In Table 2, as with the scores for Preferred Work Styles, Usual Behaviors and Needs scores that are out-of-range flag characteristics of individuals that could prevent them from being seen as (usual behavior), or being (need), reliable and trustworthy. For the interpersonal measures (Esteem, Acceptance and Empathy), experience using the Birkman indicates that for these measures, there is often a gap between Need and Usual Behavior. Individuals are often socialized to conceal their interpersonal needs. For these measures, exceptions to the lower bound of "moderate" may have less impact on social networking than for other measures.

The bounds of the competitiveness measures (Advantage and Challenge) are more significant. For example, someone with high, or very high, Need for Advantage is likely to be concerned with personal gain and less concerned with the good of the organization and so less motivated to engage in unrewarded social network activity. For the Challenge score, both very low and very high scores are undesirable. A person with a high Challenge score is hard on him/herself and on others, which might inhibit network engagement. A person with a low Challenge score is less likely to embrace tasks, such as social network engagement, that are ill defined and might be out of his/her comfort zone.

The organization-related measures are complex in their interrelationships and their potential impact on RT&C. The desirable ranges we have defined vary widely across these measures, reflecting the very different ways they come into play in network engagement. A few individuals with intense scores in an organization may not inhibit, or even support, the development of social network engagement in organizations that have a strong supportive culture in place—there are possible interactions among the characteristics that would need to be considered in a more nuanced analysis.

Finally, Stress Behaviors arising from wide gaps between Usual Behaviors and Needs, signal the likelihood of an individual having unpredictable, and potentially counterproductive, stress reactions. These Stress Behaviors can occur if a specific Need is not met either because: (1) others are unaware that an individual's Usual Behavior does not reflect the intensity of the individual's specific Need (e.g., the Usual Behavior score is 50 points higher or lower than the Need score); or (2) the individual's Need score is so high/low that having that Need met, at that level of intensity, is unlikely. These counterproductive Stress Behaviors can erode reliance and trust. Recognizing the damage that Stress Behaviors can cause to interactions, Birkman flags intense Stress Behaviors by reporting the Need/Stress scores together (i.e.., H/L, or L/H).

In addition to signaling Stress Behaviors, which can have an impact on RT&C. Needs scores are also indicators of an individual's motivation to participate, or not, in network activities. For example, an individual with a high Need for Advantage score may be so competitive that (s)he is unwilling to share information and knowledge with others, and hence would not be motivated to engage in network activity.

Table 2: Desirable Birkman Score Ranges that Foster Reliance, Trust and Collaboration (RT&C)

Preferred Work Styles	Score Range	Usual Behaviors and Needs	Score Range
Corporate Adaptability	M-VH	**Interpersonal**	
Social Adaptability	M-VH	Esteem	M-VH
Social Responsibility	M-VH	Acceptance	M-VH
Work Motivation	M-VH	Empathy	M-H
Knowledge Specialist	M-VH	**Organization-related**	
Self Development	M-VH	Structure	M-H
		Authority	L-H
		Activity	M-VH
		Change	L-M
		Freedom	L-H
		Thought	L-M
		Competitiveness	
		Advantage	VL-M
		Challenge	M-H
Notes: VL=very low, L=low, M=moderate, H=high, VH= very high. Scores outside these ranges would be considered inhibiting to building RT&C. Two management styles (Directive and Delegative) and the three pairs of problem-solving styles are not germane for RT&C. Scores for them are included in Table 4.			

BIRKMAN CHARACTERISTICS OF THE TWENTY-FIVE AND OF THE THREE MANAGERS

The twenty-five EngArc staff work in a broad range of occupations and have a cross-section of behavioral and personality characteristics. Their average Birkman scores provide information on the following: their dominant and supporting work environments, summed by their color-coded Organizational Focus bars; their work-related Interests and disInterests scores (also color coded) and their Preferred Work

Styles. Together, these data provide the context for looking more closely at the EngArc staff.

To gain insights about the behavioral and personality characteristics of the twenty-five, we discuss their average scores for Usual Behaviors, Needs and Stress Behaviors and then examine the patterns that emerge from the scatter of these scores, together with their Interests scores, as presented in their three Group Life Style Grids (Interests, Usual Behaviors, Needs/Stress).

With the benefit of this overview of the twenty-five, we then turn to the three managers. First we compare their average Birkman scores to those of the twenty-five to learn whether, and to what extent, the two groups differ. We then discuss and compare the individual scores for the three managers to determine which behavioral and personality characteristics account for the differences in their respective levels of social network engagement.

ENGARC TWENTY-FIVE

When viewed through the lens of their Organizational Focus (Figure 5), the twenty-five most closely resemble people working in Operations/Technology (Red), their dominant focus and longest bar, and in Administration and Fiscal matters (Yellow), their supporting focus and second longest bar. Birkman describes the Red bar as characterizing a work environment that emphasizes a practical, hands-on approach in a product-focused culture where people engage in direct communication. Their Yellow bar characterizes a work environment that is task-oriented and involves solving practical problems more by thinking and less by talking. Their Red/Yellow focus is consistent with the nature of the work performed by engineers and architects and of the types of individuals attracted to these fields.

Not surprisingly, their Green (Sales/Marketing) bar is shorter, given their Red/Yellow focus. Green organizations are people-oriented and focus on persuading and promoting through direct communication. Their Design/Strategy (Blue) bar is the shortest (slightly shorter than their green bar), which is surprising, given that the
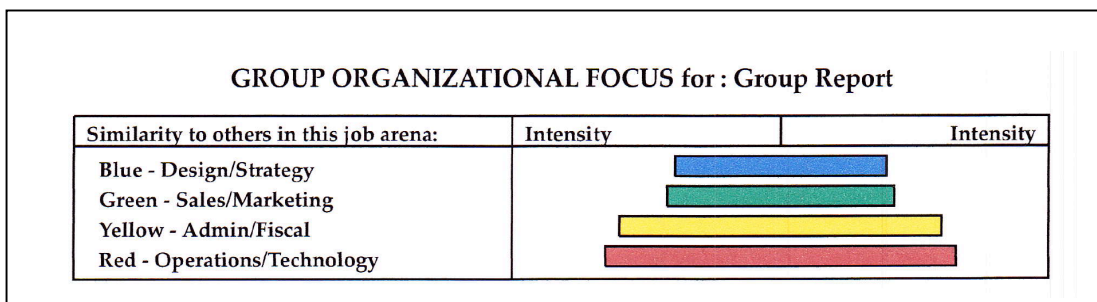

Figure 5: The Birkman Organizational Focus for the EngArc 25.

twenty-five include not only engineers but also architects, who typically have "blue" characteristics that include planning, innovating and creative communications (e.g., art and design).

As Table 3 shows, the scores for the twenty-five are, once again, descriptive of engineers and architects. Their top Red/Yellow Interests align with their Red/Yellow Organizational Focus. They have high-scoring Red Interests in Mechanical, Scientific and Outdoor and moderate Yellow Interests in Numerical and Clerical. As for their low Green (Persuasive and Social Service) and Blue Interests (Artistic, Literary and Musical), their average scores are low enough to be described as disInterests for the group as a whole.[8]

Turning to Table 4, we see that all their average scores are within the intensity ranges that facilitate RT&C in Table 2. The twenty-five have high Self Development, high Corporate Adaptability, high Social Adaptability, and high Social Responsibility scores; and a moderate Work Motivation score (which is higher than the typical white-collar worker's low score). In terms of management styles, they have a high score in Directive Management followed by a moderate preference for both the Knowledge Specialist and Delegative management styles. The Organizational Focus, Interests and Preferred Work Styles of the twenty-five sums up the EngArc corporate environment and provides the context for our discussion of the characteristics of both the twenty-five and the three managers that follows.

All the average scores for the twenty-five for both their Usual Behaviors and Needs are within the desirable range to facilitate RT&C (Table 2). We would expect that the twenty-five, as a group, would provide a supportive environment for fostering RT&C. They have a moderate Challenge score, which Birkman considers to be a more important indicator of personality characteristics than any of the other Component scores; a low Usual Behavior Advantage score; and a moderate Need for Advantage. In other words, the twenty-five, as a group, are willing to take on some tasks that may stretch them, and they are willing to put the interests of the group (and their clients) ahead of their own self-interest.

Their moderate Need for Advantage, however, suggests that they will be more productive if the firm recognizes their contributions by giving them concrete rewards. Note that the group averages were skewed by the scores of two individuals with very high Need for Advantage scores and very low Advantage Usual Behaviors scores.[9]

In terms of interpersonal relationships, the twenty-five are comfortable working one-on-one and in groups as they have a moderate average Usual Behavior score in Esteem and Acceptance (both within range) and will enjoy connecting with others in the network. Their Need for Esteem and Need for Acceptance (also within range), are

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[8] Their moderate average Musical Interest score would be low if it did not include four individuals with scores of 90 or above.

[9] From detailed individual data not included in the tables in this paper.

also moderate. The same is true for the moderate Usual Behavior for Empathy and Need for Empathy scores. Finally, the group's average scores for all six of the organization-related Uusual Behaviors and Needs are moderate and within the desirable range.

Table 3: Intensities of Birkman Interests: EngArc Sample

		N = 25 Firm Avg	N = 3 Average	3 Managers M1	M2	M3
Interests	Mechanical	H	VH	VH	VH	VH
1 to 99	Scientific	H	VH	VH	VH	H
	Outdoor	H	H	H	H	H
	Numerical	M	H	M	H	M
	Clerical	M	M	L	M	M
	Artistic	L	L	VL	M	M
	Literary	L	L	L	L	L
	Musical	M	M	L	VH	L
	Persuasive	L	L	L	VL	L
	Social Service	L	VL	L	VL	VL
	Scale					
Very High	VH ≥ 85					
High	60 < H < 85					
Moderate	40 ≤ M ≤ 60					
Low	20 < L < 40					
Very Low	VL ≤ 20					

There is, however, one Stress Behavior that could interfere with the group's network participation – Need for Authority. The group could have a stress reaction if too much authority is imposed on them (M/H Need for Authority), which could cause them to withdraw from the network or become a bottleneck. This stress reaction suggests that voluntary participation in the network is important and that if network participation were required, or imposed, it could trigger a stress reaction. This reaction is consistent with the fact that the group likes to take charge as their high score in Directive Management indicates.

As discussed earlier, the Life Style Grid summarizes and plots the Interests, Usual Behaviors, and Needs for each individual in three four-quadrant diagrams. While the symbols for reliable and trustworthy individuals can appear anywhere in the Grid, we would expect people with Interests that appear in the Red (Expeditor) and Blue (Planner) quadrants (Figure 6a) to be more active in the network. Birkman describes Planners as interested in ideas, concepts, and intellectual investigation and the Expeditors as interested in solving practical problems, working through others, and organizing people. These two categories of people are more likely to engage in network activities than Yellow (Administrator) and Green (Seller) people, who are less focused on creating content and implementation—activities supported by social networking. The same is true for their Usual Behaviors and Needs: we would expect Blue and Red people will to engage in networking more than Green and Yellow people.

Looking at the Group Life Style Grid (Figure 6a), we see that nearly two-thirds of the group's Interests scores cluster in the Red (Expediter) and Yellow (Administrator) quadrants, and that their remaining Interests scores are thinly scattered, equally, in the Green (Seller) and Blue (Planner) quadrants (Figure 5).[10] The distribution of Usual Behaviors (Figure 6b) and Needs (Figure 6c) scores, however, show a very different pattern. Nearly half cluster in the Blue Usual Behaviors quadrant and slightly fewer in the Blue Needs quadrant. Focusing on the ten individuals with Blue Needs, we see that nine of them also have Blue Usual Behavior scores.[11] None of these ten, however, is in the Blue Interests quadrant. As discussed earlier, for this group, their Interests do not reveal their Usual Behaviors or Needs.

In summary, in spite of their strong Red/Yellow Interests, many of the twenty-five behave like Blue (Planner) people and share needs more typical of Blue people than of Red/Yellow (Expediter/Administrator) people. We see that for roughly half of the twenty-five, Usual Behavior and Needs scores appear in the Red and Yellow quadrants of the Grid (Figures 6b and 6c). The representation of Green (Seller) scores in the Grid is uniformly sparse, and consistent with their low Interests, Usual Behaviors and Needs.

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[10] The terms associated with the four colors used for the quadrants in the Life Style Grid sum up the descriptive terms used for the same colors in the Organizational Focus bars.

[11] Based on analysis of the underlying data.

Table 4: Birkman Preferred work styles: EngArc sample

		N = 25 Firm Avg	N = 3 Average	3 Managers M1	M2	M3
Management styles	Knowledge specialist	M	M	M	H	L
	Directive	H	VH	VH	H	VH
	Delegative	M	L	L	L	M
Corporate styles	Work motivation	M	H	VH	H	H
	Self development	H	H	H	H	H
	Corporate adaptability	H	H	M	H	H
Social styles	Social adaptability	H	H	H	H	H
	Social Responsibility	H	H	H	H	H
Problem solving	Public contact/detail	M/M	M/H	L/H	L/H	H/L
	Global/linear	L/H	L/H	VL/VH	M/M	L/H
	Conceptual/concrete	M/H	L/H	L/H	VL/VH	L/H
	Scale					
Very High	VH = 10					
High	7 ≤ H ≤ 9					
Moderate	4 ≤ M ≤ 6					
Low	2 ≤ L ≤ 3					
Very Low	VL = 1					

Table 5: Birkman Usual Behaviors and Needs/Stress Scores: EngArc Sample

		Usual Behaviors					Needs/Stress				
		N = 25 Firm	N = 3	3 Managers			N = 25 Firm	N = 3	3 Managers		
Characteristics		Avg	Average	M1	M2	M3	Avg	Average	M1	M2	M3
Interpersonal	Esteem	M	**VL**	**VL**	**VL**	M	M	M	**L**	H
1 to 99	Acceptance	M	H	VH	VH	M	H	H	VH	**VL**
	Empathy	M	**L**	**VL**	M	M	**VL**	**VL**	**VL**	**L**
Organization-related	Structure	M	M	M	**L**	M	M	**VH**	**H/L**	**L**
1 to 99	Authority	M	M	M	M	M/H	M	H	M	L
	Activity	M	VH	VH	VH	M	H	VH	H	M
	Change	M	L	**VL**	L	M	M	M	**L/H**	**H**
	Freedom	M	L	**VL**	M	M	M	L	M	**H**
	Thought	M	M	**VL**	**H**	M	M	L	**L/H**	**VH**
Competitiveness	Advantage	L	L	VL	L	M	L	L	L	M
1 to 99	Challenge	M	M	M	**VH**	M	M	M	**VH**	**VL**

Notes: Very high (VH), High (H), Moderate (M), Low (L), and Very low (VL), N is the number of observations.
Entries in bold indicate scores that are outside of the desirable ranges specified in Table 2.

THE THREE MANAGERS

In the previous section, we concluded that blue and red people, in all three Grids, are more likely to engage actively in social networking. In EngArc, blue and red are dominant in the Usual Behaviors and Needs Grids, and red dominates in the Interests Grid. These characteristics of EngArc indicate an organization that should foster social networking. To understand why specific individuals engage, or not, in social networking requires a more detailed and nuanced analysis of their interests and behavioral and motivational profiles. In this section, we present the analysis of the three managers identified in the social network analysis to have differing network characteristics while managing similar groups.

The three managers (all men) share many of the characteristics of the twenty-five). They share the same Red/Yellow Organizational Focus[12] and many of the same Interests as the twenty-five (Table 3).[13] They also closely resemble the twenty-five in terms of their respective Preferred Work Styles (Table 4). The three differ from the twenty-five in a number of ways. They have a a very high average score for Work Motivation (i.e., the higher the score the more the individual is committed to finding

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[12] The Organizational Focus figure for the three managers so closely resembles the Organizational Focus of the twenty-five that is not shown.

[13] See Figure 5 for EngArc 25 Organizational Focus. The three managers are not separately shown. Their bar charts closely resemble the 25.

value in most jobs and roles), which indicates that the three managers are committed to getting the work done, whether they enjoy it or not—an important factor in fostering reliance (Table 4). Like the twenty-five, they have a moderate average score for the Knowledge Specialist style of management. In contrast to the twenty-five, they have a very high Directive management style, and a very low Delegative Style (Table 4). They prefer to get the work done, which is not surprising given their very high Usual Behavior score for Authority (Table 5).

There are, however, marked differences between the three (M1, M2, and M3), particularly with regard to gaps between their Usual Behavior scores and their Needs scores (Table 5). We turn first to the two competitiveness measures, Challenge and Advantage, which provide insights into an individual's behavior and motivation in the context of network engagement.

Birkman considers the Need for Challenge score to carry more weight than any of the other Usual Behavior and Needs scores. M1's moderate Challenge score is in the desirable range and indicates that he strikes a balance between the challenge of taking on tasks he knows he can accomplish and tasks that he perceives as riskier. In contrast, both M2 and M3 have out-of-range Challenge scores -- very high score and very low respectively. People with high Challenge scores, such as M2, are more than willing to risk failure, but they can be very hard on themselves and demanding of those with whom they work. In contrast, people with low Challenge scores, such as M3, only take on tasks that will make them look good because they are certain that they can accomplish them.

For Advantage, the desirable score for RT&C is VL-M (Table 2). Individuals with low scores for Advantage Usual Behavior and Need place the group's wellbeing ahead of their own – a desirable trait for RT&C. All three managers have low to very low Usual Behavior in Advantage and low to moderate Need for Advantage. M1's combination of moderate Challenge and low Advantage scores indicates that he is a solid citizen. He cares about the firm and would support the role of the social network in the life of the firm. M3's very low Challenge combined with his moderate Need for Advantage implies that he needs some immediate, concrete rewards to participate in the network. M2, on the other hand, has very high Challenge and low scores for Usual Behavior and Need for Advantage, which is likely to make him much more enthusiastic about participating in the network than M3 but likely a bit less than M1. The ranking of M1, M2, and M3 in terms of competitiveness carries over into all of the other measures.

In terms of interpersonal measures (Esteem, Acceptance, Empathy), the three managers are on the low side of the Empathy scores and all have scores that are out of range except for M2 whose Usual Behavior is moderate. All three are very low on Esteem, Usual Behavior, but all higher in terms of Need for Esteem. For these measures, the intensity of the needs made be more important than usual behavior in determining network engagement. In the case of M3, the big gap between his score for Need and Usual Behavior for Esteem indicate that he will not get his need met and therefore will be less likely motivated to support and engage in the social network.

The six organization-related measures (Table 5) vary widely across the three managers. While M1 has three out-of-range scores for Usual Behavior (VL in Change, Freedom and Thought), these three scores are all within range for Needs. For these measures, the intensity of the Needs is the driver for RT&C. The only other out-of-range score is a VH for Need for Structure, which compares to moderate for his Structure Usual Behavior. The SNA analysis indicates the deepening of the social network over time, which would be a plus for M1, given his VH for Structure. From the Birkman perspective, M1 has a profile that supports both RT&C and network engagement.

M2 has two organization-related Usual Behaviors scores that are out of range: a low score for Structure (imposing low structure on others) and a high score for Thought (he takes a lot of time to make small decisions). Social networks require engagement in a structured environment, and he likely appears to others as not supportive of such a structure. In contrast, he does need to work in a structured environment (high Needs score) and may find the social network to be too loosely defined.

M2 has three Needs with stress scores, all of which trigger out-of-range behavior (H/L Structure, L/H Change, and L/H Thought), which might well interfere with RT&C because his behavior is unpredictable. Under stress, however, if too much structure is imposed on M3, he will exit from, or break out of, the existing structure (e.g., "I did it my way"). Both M2's low Need score for Structure and his associated Stress Behavior (L/H Structure), make him a less likely prospect to engage with others in a social network.

M2 also has a second stress reaction: his Change score shifts from his low Usual Behavior and low Need scores to a high Needs score under stress (out of the desirable range). He appears to others as being comfortable with the status quo, but under stress he is likely to make abrupt changes, which will make him appear unpredictable. Because these three stress reactions disrupt social relationships, they will likely interfere with productive network engagement. In sum, we would expect M2 to be less engaged in networking than M1.

M2's high Thought Usual Behavior score suggests to others that he cannot make quick decisions or respond quickly in a network environment. In addition, he has a low score in Need for Thought (decisive in making complex decisions), but under stress he requires much more time for decision making, which sends mixed signals to his colleagues and likely slows down his network engagement.

Finally, we turn to M3 to identify the characteristics that explain why the SNA results indicate that he is much less engaged in the social network than either M1 or M2. Looking at the distribution of his scores in the three Life Style Grids, (Figures 7a, b, c) we see that he has a very different pattern from both M1 and M2. While both M1 and M2 are in the Red quadrant for all three Grids, M3's Interests appear in the Red quadrant, his Usual Behaviors in the Yellow quadrant, and his Needs in the Blue quadrant.

M3 has seven out of 11 Needs that are out-of-range, of which four out of six are organization-related scores: L Structure, H Change, H Freedom, and VH Thought, He also has a wide gap in scores between Usual Behaviors and Needs for Activity, Change, and Thought. Of the three managers, he has the most deviation between how others see him and his needs, which will likely trigger unpredictable stress reactions. With respect to network engagement, the wide gap between his Usual Behavior and Need for Thought is notable because he goes from out of range very low to out of range very high. In sum, of the three, the Birkman analysis suggests that M3 would be the least likely to engender RT&C, or see it in his interest to engage in the network. The SNA results confirm this characterization—M3 has the lowest level of network engagement of the three.
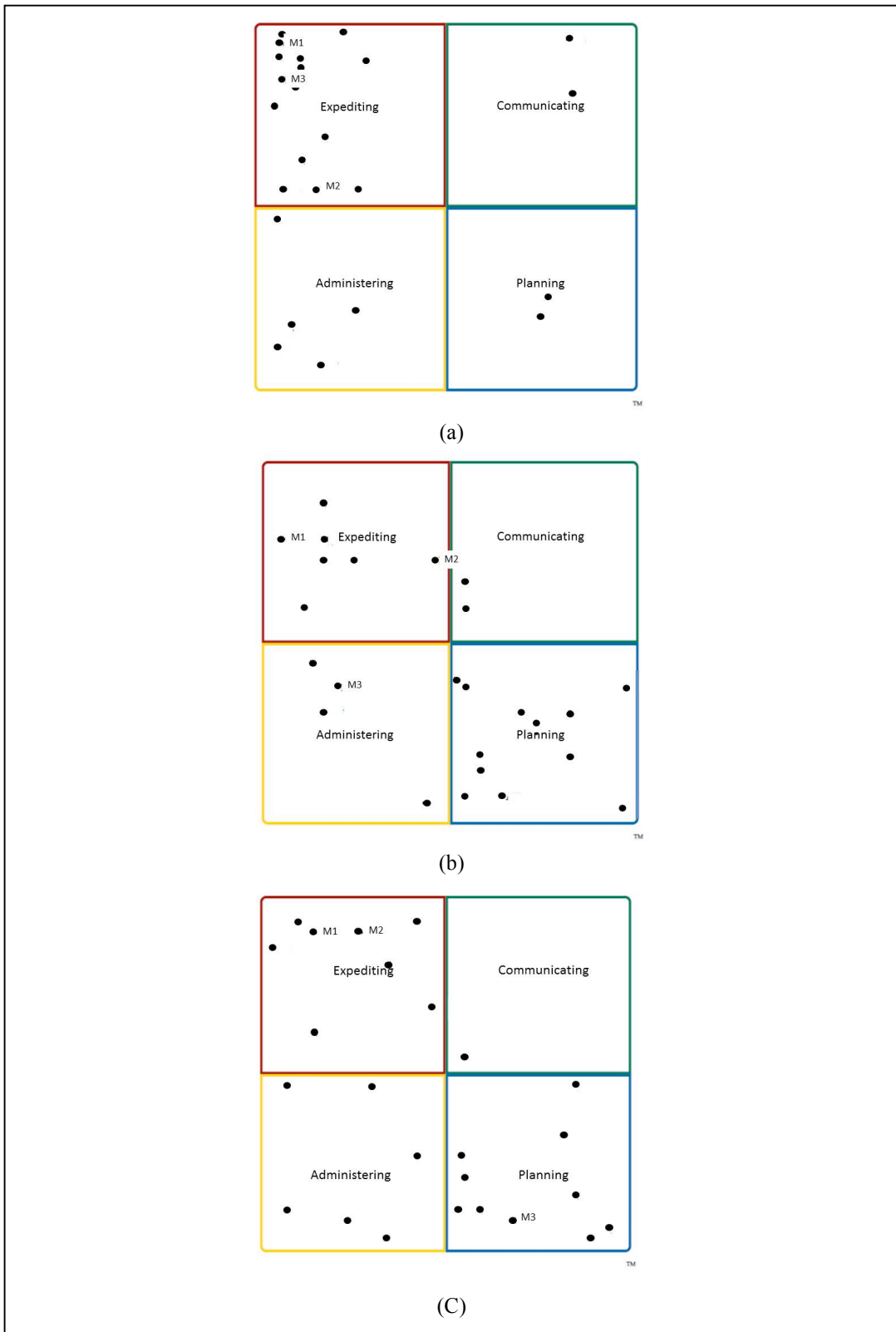
(a)

(b)

(C)

Figure 6 (a-c): The Life Style Grids for the EngArc 25 for Interests (a), Usual Behaviours (b), and Needs/Stress (c).
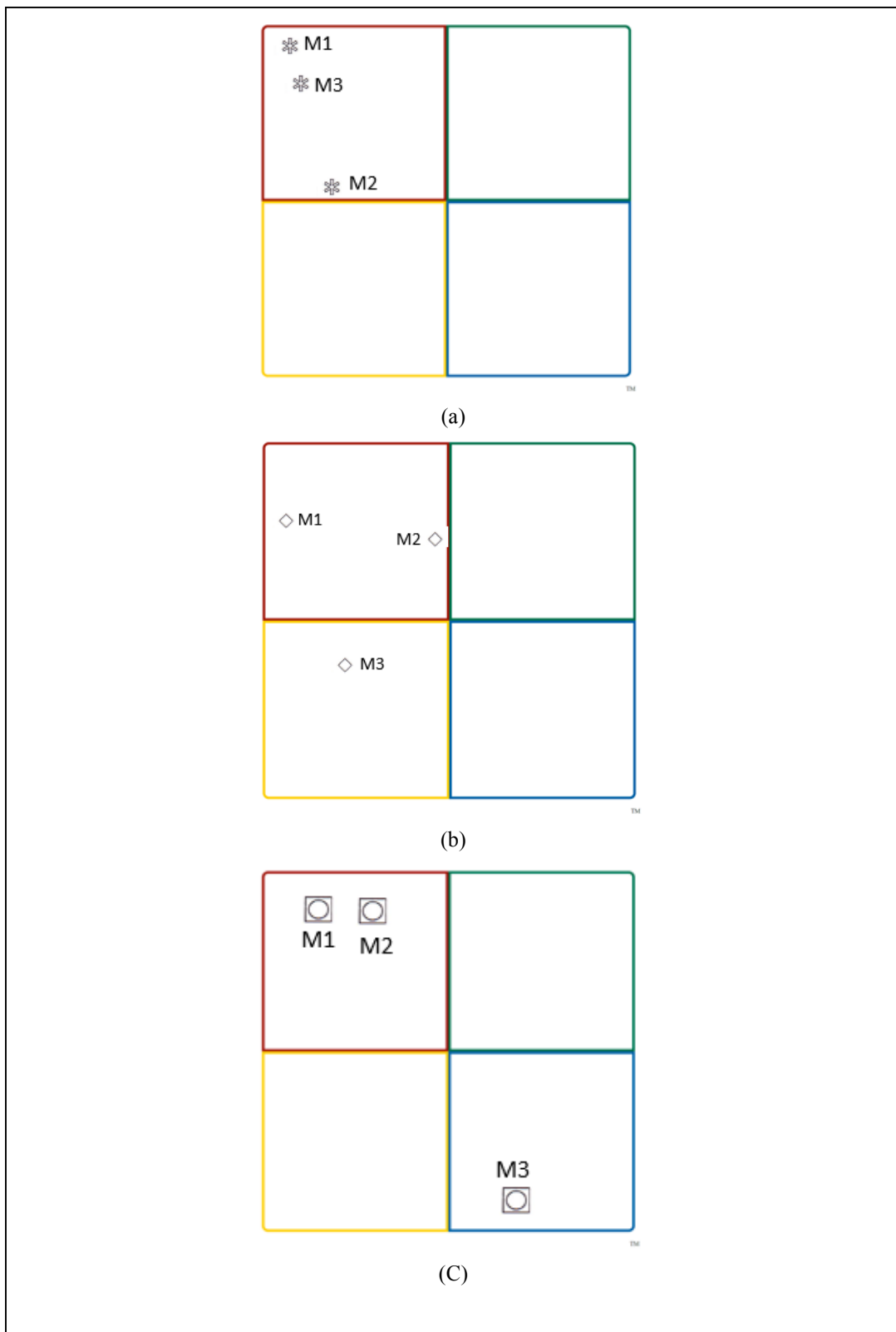
(a)

(b)

(C)

Figure 7 (a-c): The Life Style Grids for the EngArc 3 managers for Interests (a), Usual Behaviours (b), and Needs/Stress (c).

CONCLUSION

The results of our study of the mechanics of network engagement at EngArc indicate that staff are changing the ways their teams function, based on the insights they gained through the multiple SNA studies. Their social network has evolved from being heavily focused on a small, central core of individuals, responsible for key network links. Now it is a broader, more decentralized network with many more individuals contributing to communications flow, information transfer and knowledge exchange on a regular basis. Of particular note is the effort that the organization has made to reduce the discipline-based islands seen in Phase 2.

Overall, the organization has increased the number of links over a broader set of individuals, and has made an attempt to include more individuals in each of the networks. On the potentially negative side, the organization still has a strong reliance on senior personnel to manage project and organization issues. This reliance risks a return to the previous more centralized social network with a small group of individuals controlling the process and decision making for client and organization issues. Returning to a more centralized network could have a negative influence on the long-term growth and health of the organization.

Our personality assessment study quantified the social dynamics at EngArc by using Birkman psychometric data from twenty-five staff. The data provided a context for our analysis by summing up their best working environments and their top-ranking work-related interests, both of which are Red/Yellow (get-it-done, task-oriented). We also learned that their preferred work styles support network engagement as they have high scores in both organizational and social styles; i.e., a commitment to work, to the people in the organization, to the organization itself, and to social values, in general.

We identified specific behavioral and personality characteristics and defined the intensity of the Birkman score ranges for each characteristic to indicate whether the score was within the range that would foster RT&C, or, if out-of-range, would inhibit RT&C. The ranges were determined based on our best judgment, using Birdman's formal definitions and detailed discussion of the measures, as well as on our experience using the Birkman instrument. With data from more case studies and larger samples, one could do a statistical analysis of the empirical relationship between the SNA data and Birkman data that would provide more precision. With only a small sample and a single firm, the score ranges have provided a good starting point for directly associating specific SNA concepts with Birkman data.

The study focused on three EngArc staff members (M1, M2, and M3), a subset of the twenty-five, to understand why they differed from one another in their level of network engagement. The three have similar managerial roles in the organization but developed notably different network topologies within their groups. When comparing the three to one another using the Birkman measures, we were able to explain why M1 is more engaged than M2 and why M3 is much less engaged.

One implication of this study is that measurable behavioral and personality characteristics of managers in key network positions shapes their behavior within the network. Given their roles as managers, these individuals can either facilitate or inhibit information and knowledge transfer and affect the overall operation of the organization. Although these observations result from a single case study, they provide a starting point for identifying specific attributes of managers that an organization may want to emphasize in developing a network.

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