FUNCTIONAL AND VISIONARY LEADERSHIP IN

SELF-MANAGING VIRTUAL TEAMS

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1. ABSTRACT

In this conceptual article, we present a theory of leadership in self-managing virtual teams. We describe leadership in this setting as a process that results in the creation, reinforcement and evolution of shared mental models and shared norms that influence team member behaviour towards the successful accomplishment of shared goals. We distinguish two types of leadership. We identify leadership that works within and reinforces existing models and norms to influence team contributions as "functional" leadership. We identify leadership that results in changes in models and norms as "visionary" leadership, a subtype of transformational leadership. We propose that effective self-managing virtual teams will exhibit a paradoxical combination of shared, distributed functional leadership complemented by strong, concentrated and centralized visionary leadership and that visionary leadership is enabled by functional leadership in the form of substantive team member contributions.

Keywords: Self-managing teams, virtual teams, structuration theory, leadership

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In this conceptual article, we develop a theory of leadership in self-managing virtual teams. By leadership, we mean a "process of social influence in which one person is able to enlist the aid and support of others in the accomplishment of a common task" (Chemers, 2014, p. 1) (though we will argue that team leadership is often exercised by more than one person). By virtual teams, we mean groups of people working on a shared task while interacting primarily or exclusively via information and communication technologies. Virtual teams are commonly employed in organizations as they bridge discontinuities of time and geography, allowing the organization to leverage human and intellectual capital wherever it resides globally (Duarte & Snyder, 2001), to create flexibility in staffing to meet changing demands and to reduce travel costs (Hoch & Kozlowski, 2014). By self-managing teams, we mean teams with the collective autonomy and responsibility to plan, manage and execute tasks interdependently to attain a shared goal (Magpili & Pazos, 2018). Self-managing virtual teams combine the benefits of both types of teams, and so have become increasingly pervasive (Lim, 2018).

The distinctive features of virtual and self-managing teams affect the nature and processes of team leadership. Unlike conventional co-located teams, whose members work in relatively close proximity and interact regularly face-to-face, members of virtual teams are geographically and often organizationally or culturally separated (Watson-Manheim, Chudoba, & Crowston, 2002). Virtual teamwork is often characterized by "behavioral invisibility" (Wilson, Straus, & McEvily, 2006, p. 16) meaning that leaders cannot easily observe team member behavior, making it difficult for them to manage team task and social dynamics. Team process is more difficult to moderate because of the reduction in social interaction. Traditional

forms of social control such as direct supervision, physical proximity and shared physical experiences are largely absent (Pinsonneault & Caya, 2005). Finally, opportunities to give and to receive feedback are reduced, as are opportunities to assess perceived commitment to project or team goals (Konradt & Hoch, 2007). Leadership structures observed in virtual teams may include permanent leaders, rotating leaders, managing partners, structures in which facilitators or coordinators assist teams in completing their work, as well as leaderless (self-managing) structures (Beyerlein, Nemiro, & Beyerlein, 2008). However, the literature suggests that virtual teams are more likely to be self-managing regardless of whether a formal leader is appointed (Mathieu, Maynard, Rapp, & Gilson, 2008).

In self-managing teams, power, authority and ownership are distributed, resulting in a shared leadership model with members holding collective responsibility for project outcomes (Magpili & Pazos, 2018; Yang & Guy, 2011). Self-managing teams have been the topic of much theorizing and empirical inquiry. However, the theorizing has primarily focused on the dynamics of self-management in co-located teams (Bell & Kozlowski, 2002; Hertel, Geister, & Konradt, 2005; Mathieu et al., 2008). Hoch and Dulebohn (2017) suggest that the underlying dynamics by which self-managing leadership structures emerge will differ in virtual teams because the discontinuities present in the virtual environment impact all forms of leadership structures and dynamics. In sum, when teams exhibit high levels of both virtuality and self-management, their leadership dynamics challenge leadership theories, particularly many theories designed to explain interactions between subordinates and a single individual who occupies a formal, appointed managerial or supervisory position in a hierarchical organizational setting (House & Aditya, 1997).

The purpose of this paper is to develop a theory of leadership in self-managing virtual teams in which majority of teamwork is done and coordinated virtually and where formal leaders if any lack influence, the basis for leadership. Another difference we seek to address is that in much of the organizational leadership literature, the leader is positioned as an individual who develops strategies and motivates others to do the work. In contrast, self-managing virtual teams are typically action-oriented, where contribution to the team's work is crucial part of leadership (Eseryel & Eseryel, 2013), and where the leaders do not have the luxury of only focusing on strategy, motivation and task coordination.

For our theorizing, we integrate different leadership theories from the management literature and finding about virtual teams from the management information systems field, using structuration theory as a meta-theory. A new theory of leadership is needed to address leadership in self-managing virtual teams because, despite these differences, past research has tended to borrow from organizational leadership theory. This body of theory has addressed some of these teams' distinctive dynamics but so far in a piecemeal fashion. For example, action-embedded transformational leadership theory (Eseryel & Eseryel, 2013) is an adaptation of transformational leadership theory (Bass, 1985) to the virtual team setting. There are different theories for when leadership is emergent (Carnabuci, Emery, & Brinberg, 2018; Hoch & Dulebohn, 2017), or shared (Hoch & Kozlowski, 2014), or when there are assigned leaders (Morgeson, DeRue, & Karam, 2009; Sharma & Kirkman, 2015). However, there is not as yet an integrated perspective that focuses specifically on self-managing virtual teams, the gap that we seek to address with our theorizing.

2. LITERATURE REVIEW

Since there is not literature that integrates leadership in self managing and virtual teams, in the literature section, we review the distinct literatures on leadership in self-managing teams and leadership in virtual teams. The literature on leadership is voluminous, so we necessarily focus on the subset of the literature most relevant to our topic. Northouse (2018) provides a more complete picture of the general leadership literature.

2.1 Leadership in Self-Managing Teams

A self-managing team is a group of individuals with diverse skills and knowledge with the collective autonomy and responsibility to plan, manage, and execute tasks interdependently to attain a common goal (Magpili & Pazos, 2018). In a true self-managing team, power is distributed among team members and all members are collectively responsible for project success (Magpili & Pazos, 2018; Yang & Guy, 2011). Although this definition may appear to suggest that self-managing teams are "leaderless", i.e., that formal leadership is absent, this is not necessarily the case. Self-managing teams range from teams embedded within formal organizational hierarchies in which a formal leader is appointed by upper-level management to loosely configured groups of individuals who come together to discuss or solve some issue or problem. In the former case, the external leader may be appointed to facilitate and develop team motivation and ability of members to lead themselves (Rapp, Gilson, Mathieu, & Ruddy, 2016). Stewart and Manz (1995) identify modelling, assisting, boundary spanning and mediating relationships with other units as associated with the most significant long-term improvements in self- managing teams.

Much of the empirical research on self-managing teams has focused on the conditions under which the first type of team, those embedded within organizational hierarchies with

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designated team leaders (or managers), become fully self-managing (Druskat & Wheeler, 2003; Stewart & Manz, 1995; Stoker, 2008; Wageman, 2001). The later arrangement, a loosely configured group, is frequently seen in community-based organizing or in Internet-based groups such as open source software development teams. As such, self-management can be thought of as a continuum rather than as a state (Offermann & Scuderi, 2007; Stewart, Courtright, & Manz, 2010).

Wageman (2001) describes self-management as a behavioral process in which self-managing teams are given the authority to execute work and to monitor and manage work processes, for both of which they are held accountable. On the other hand, specification of team goals, objectives and constitution are often assumed to be outside the domain of self-management. However, this limit may be a function of the context in which the teams are embedded. As technology facilitates the development of new means of interacting and organizing, the degree to which decisions about goals, objective and constitution are integrated within the scope of teams' authority may change. For instance, open source software development teams typically do take responsibility for determining goals and objectives as well as team membership. External leadership may in fact be non-existent, or in the presence of the discontinuities present in the virtual environment, ineffective in providing this type of direction.

The definition of leadership as helping a team to achieve shared goals implies that the success of leadership can be assessed by whether the team achieve its goals. Cohen, Chang, and Ledford (1997) suggested that degree of team member involvement is the strongest predictor of team effectiveness, and that managerial, or supervisory, behaviors performed by formal, appointed team leaders are ineffective in self-managing teams. The implication of their findings is that a focus on external leadership does not adequately capture the team's internal and

emergent leadership dynamics. Decades of research on small-team interactions supports the notion that even in ordinary teams, different individuals may perform different leadership roles as circumstances warrant. Such shared leadership is defined by Pearce and Conger (2003) as:

> *A dynamic, interactive process among individuals in groups for which the objective is to lead one another to the achievement of group or organizational goals or both… (that) often involves peer, or lateral, influence and at other times involved upward or downward hierarchical influence (p. 1).*

This perspective, similar to the notion of distributed leadership (Gronn, 2002), conceptualizes leadership in terms of relational processes, shared phenomena occurring at different levels and interdependencies among social networks or networks of influence (Fletcher & Kaufer, 2003, p. 21). It differs from conventional leadership theory by conceptualizing leadership as a group-level rather than an individual-level phenomenon. Fletcher and Kaufer (2003) noted that in doing so it creates an important theoretical link between leadership research and research on teams that had been largely absent in prior work.

Yang (1996) identified shared leadership as an outcome of effective self-management in teams. Indeed, the phenomenon may be more general. Houghton, Neck, and Manz (2003) observed that when the task-oriented and social supportive-oriented leadership roles in small teams have been examined empirically, these leadership roles are often split between two or more individuals. They attribute this outcome to the tensions created when one individual attempts to fulfill both roles, noting that "the directive or task-oriented leader often creates tension within the group through the assignment of tasks…(and) may not be in the best position to fill the social supportive role of solving or soothing the problems created by the task-related tension" (Houghton et al., 2003, p. 126). Alternately, the split may be due to differing levels of

expertise. For example, Klein, Ziegert, Knight, and Xiao (2006) described how attending surgeons, fellows and residents dynamically shared leadership in a trauma care unit, as the surgeons stepped back to allow fellows and residents to assume leadership roles. Pearce and Sims (2002) similarly note that team members can and do perform leadership roles that had previously been the performed by managers.

Shared leadership has a clear impact on team performance, suggesting its effectiveness. Wang, Waldman, and Zhang (2014) carried out a meta-analysis of 42 studies of shared leadership and found a positive relationship between shared leadership and performance, with a strong effect for "cumulative, overall shared leadership", meaning situations where many or all team members were perceived as providing leadership. In another meta-analysis of 50 studies, D'Innocenzo, Mathieu, and Kukenberger (2016) also find a positive relationship between shared leadership and performance, and went on to note that many studies had adopted "hierarchical leadership themes", suggesting that the actual effect could be even stronger. Empirical investigations of shared leadership have often examined it in organizational settings in which both vertical and shared leadership were present. For example, in Klein et al. (2006's)'s study, attending surgeons formally outranked fellows and residents. Studies investigating the relationship between vertical and shared leadership and team effectiveness suggest that even in the presence of vertical leadership, shared leadership is a useful predictor of performance (e.g., Ensley, Hmieleski, & Pearce, 2006; Pearce & Sims, 2002). Another meta-analysis of 52 articles (Nicolaides et al., 2014) found that shared leadership had about the same standardized regression weight on performance as did vertical leadership.

Research has identified additional factors that contribute to the success of self-managing teams. In particular, Druskat and Pescosolido (2002) argued that it is critical that self-managing

work teams develop shared mental models, which they define as "cognitive theories about how the system operates that underlie behavioral team process" (p. 285). Specifically, they identify shared mental models of psychological ownership of team outcomes and processes that support continuous learning, and that promote heedful interaction as underlying success in terms of team process and outcomes. Barnett and Weidenfeller (2016) also note the importance of shared cognition. Shared mental models have also been found to be useful in virtual teams. In a study of global software development, Nordbäck and Espinosa (2019) found that shared mental models about shared leadership were important for performance.

On the whole, the literature on self-managing teams reinforces the notion that leadership is often shared in these teams (Pearce & Manz, 2005). When external team leaders are appointed, their responsibilities are largely to facilitate (or mentor) rather than to direct the work of teams. The empirical findings also suggest that observed behaviors related to the process and the substance of the task are important factors related to team effectiveness. Finally, research has identified the importance of shared mental models to enable team members to work together effectively in the absence of direction from a singular leader.

2.2 Leadership in Virtual Teams

We turn next to research on leadership in virtual teams. This research has most often adopted theoretical frameworks initially developed to investigate leadership dynamics in co-located teams. The majority of studies have been either implicitly or explicitly informed by *functional behavioral leadership* theories (Hackman & Walton, 1986; Kayworth & Leidner, 2002; Tyran, Tyran, & Shepherd, 2003; Weisband, 2002; Yoo & Alavi, 2004) that focus on the behavioral styles, orientations, or patterns that leaders manifest (Denison, Hooijberg, & Quinn, 1995; Hooijberg, Hunt, & Dodge, 1997; Lord, 1977).

A key interest of leadership researchers guided by this perspective has been empirically identifying the specific task- and relationship-oriented behaviors that distinguish leaders from non-leaders in teams (e.g., Carte, Chidambaram, & Becker, 2006; Hoyt & Blascovich, 2003; Kayworth & Leidner, 2002; Piccoli, Powell, & Ives, 2004; Wickham & Walther, 2007). Typically in these investigations, individuals are assigned to virtual teams and required to complete a task that may range in duration from a week to several months. In some of these studies, a team member was appointed as the team leader at the outset. In others, no team member was appointed as the team leader. Once teams completed their tasks, team members were asked to identify who the team leader(s) had been and the behaviours of those leaders is then examined. Other studies have taken a similar approach to studying intact teams (e.g., Hoch & Dulebohn, 2017; Johnson, Safadi, & Faraj, 2015).

A first finding concerns the emergence of leadership in virtual teams. While some teams evolved a leadership structure in which one or two team members emerged who were recognized by others as the team's leader, other teams evolved less-centralized leadership, interaction, influence and participation patterns in which the leadership of the team was shared among its members (Yoo & Alavi, 2004). In the latter case, no single individual or core group of individuals was identified as the team leader(s). Even in studies in which a team member was appointed as the team's leader at the outset, individuals other than the appointed leader were often identified by other team members as having performed leadership behaviours (Kayworth & Leidner, 2002; Weisband, 2002).

As in self-managing teams, shared leadership seems important for virtual team success. In a field study of 101 virtual teams, (Hoch & Kozlowski, 2014) found that hierarchical leadership was less associated with team performance as the degree of virtuality increased, while

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shared team leadership was significantly related regardless. Hoch and Dulebohn (2017) proposed

a framework for virtual teams that included both shared and emergent leadership impacts on

team performance, while Liao (2017) suggested that leaders of virtual teams should facilitate

shared leadership. In other words, whether or not a leader is appointed, virtual teams leadership

structures seem to emerge based on the interactions of team members (Jarvenpaa & Leidner,

1999; Kayworth & Leidner, 2002; Weisband, 2002; Wickham & Walther, 2007; Yoo & Alavi,

2004). (Northouse, 2018) defines emergent leadership as being a process-based phenomenon

resulting from continued interaction among organizational or team members:

> *When an individual is perceived by others as the most influential member of a*
> *group or organization, regardless of the individual's title, the person is exhibiting*
> emergent leadership. *The individual acquires leadership through people in the*
> *organization who support and accept that individual's behavior. This type of*
> *leadership is not assigned by position, but rather emerges over a period of time*
> *through communication (p. 5).*

Having identified which individuals are perceived as leaders, the next question is what

predicts these perceptions. While status, power, or hierarchical position within an organization

often are associated with leadership attributions in co-located teams, these cues are often largely

or completely absent in virtual teams, especially in those in which membership crosses

organizational boundaries. The literature suggests that leadership attributions are made instead

on the basis of observed behaviors: the team leader or leaders are those who are perceived by

team members as having performed a leadership function within the team (Fairhurst &

Connaughton, 2014; Weisband, 2002; Yoo & Alavi, 2004). Accordingly, quantity and initiation

of communication have been consistently associated with being identified as a virtual team leader (Piccoli et al., 2004; Tyran et al., 2003; Yoo & Alavi, 2004).

Turning to the content of the communication, the two-factor theory that underlies the functional theory of team leadership has been a common theoretical framework. Derived from Bales' (1950) work on small group dynamics, this theoretical perspective suggests that leaders engage in both task-oriented and relationship-oriented behaviors. Task-oriented behaviors are those that move the team forward in the accomplishment of its task, such as scheduling and planning work, initiating activity, coordinating subordinate activities, elaborating, problem-solving, proposing solutions, removing barriers or providing resources, providing feedback and providing, elaborating or summarizing information (Yukl, 2002, p. 53). Relationship-oriented behaviors are those that allow the team to maintain a positive psycho-social dynamic, such as gate-keeping, showing trust and confidence, expressing group emotion, conflict resolution, maintaining a positive atmosphere, sowing concern for others, expressing gratitude, keeping subordinates informed and providing recognition for subordinates' accomplishment (Yukl, 2002, p. 53). Morgeson et al. (2009) offered a similar list of leadership behaviours, suggesting that informal internal leadership, which we argue characterizes virtual teams, is best positioned in the action phase to behaviours including performing the team task, solving problems, supporting the social climate, monitoring the team and managing team boundaries but not to challenging the team, providing resources or encouraging team self-management.

Empirical research has found that all of these behaviours are related to perceptions of leadership in virtual teams. Pescosolido (2002) and Hart and McLeod (2003) find that emergent leaders increase their task-oriented communication in order to reduce ambiguity, provide direction, and move the work of the team forward. Bell and Kozlowski (2002) note the initial

importance of "development and shaping of team processes" via team orientation and "coaching to establish 'team coherence'" and the ongoing importance of "monitoring and management of ongoing team performance" (p. 17). Carte et al. (2006) found that higher performing teams engaged in significantly more concentrated behaviors oriented toward performance and more shared behaviors focused on process (i.e., keeping track of the team's work) than lower performing teams. Jarvenpaa and colleagues' (1998; 1999) suggested that social exchanges establish "thick" relationships among virtual team members as long as social exchange does not detract from the team's task focus. As well, leaders share knowledge either in the form of technical knowledge, expert opinion or procedural knowledge (Faraj, Kudaravalli, & Wasko, 2015).

Finally, recent research has shown that beyond communication, individuals' substantive contributions to the shared goal ("performing the team task") contribute to leadership perceptions in virtual teams (Eseryel & Eseryel, 2013; Faraj et al., 2015). Eseryel and Eseryel (2013) found that in virtual information systems development teams, the action-based leaders influence the team's vision and strategy for technology development by "significantly contributing to the software development effort… over long periods of time" (p.109). Faraj et al. (2015) showed that individuals perceived as leaders in a software team contribute to knowledge by providing software code, meaning they contribute to the software development by doing work, not only by providing technical knowledge and guidance. This focus on work is different from traditional leadership theory's view of leaders who provide influence by communicating a vision or strategy, rather than by doing work that achieves a vision and strategy piece-by-piece over time.

2.3 Summary

The self-managing teams and shared leadership perspectives, and the results of empirical investigations of emergent leadership in virtual teams based on functional behavioral leadership theory, suggest that leadership in teams can be both shared and emergent and that shared leadership can be an important contributor to team effectiveness. In Morgeson et al. (2009)'s leadership framework, these teams thus rely more on informal internal leadership. Behavioral leadership theory provides additional insights into the classes of leadership behavior that leaders in these types of teams manifest such as task-oriented and relationship-oriented behaviors. Furthermore, individuals' substantive contributions to the shared work contribute to leadership perceptions in virtual teams and such engagement is predictive of effectiveness. However, existing theory and empirical research also do not completely explain how leadership behaviors enacted by individuals guide team interaction in self-managing virtual teams. While the studies from which these conclusions are drawn are informative, they most often sought to work within existing theories, even while providing evidence that the basic assumptions about the nature of leaders underlying much of traditional leadership theory (e.g., trait and new leadership theory, contingency and situational leadership theories, social exchange and strategic contingency theories, and leader-member exchange theories) need to be adapted to describe leadership in the self-managing virtual team setting. Understanding these adaptations is the motivation for our theorizing.

3. MODEL DEVELOPMENT

In this section we synthesize a model for leadership in self-managing virtual teams by building on the findings about leadership in virtual and self-managing team reviewed above and on other theories of leadership. We started this paper with a definition of leadership as "process

of social influence in which one person is able to enlist the aid and support of others in the accomplishment of a common task" (Chemers, 2014, p. 1). The question we seek to answer with our theorizing is, how is such influence exerted in a setting in which interaction is virtual and where leaders, if they are identified at all, lack formal authority or other supports for influence? Our argument, drawing on a structurational perspective (Giddens, 1984), is that team members are guided in their day-to-day to contributions not by direction from a leader but rather by shared mental models of the work, the team and the situation and by shared norms about how to work and what constitutes good work. These models and norms are shaped by the continuing contributions of the team members, either to reinforce them or to modify them. Thus, we define leadership in this context as follows:

> *Leadership in self-managing virtual teams is a process that results in the creation, reinforcement, and ongoing evolution of shared mental models and norms that guide the actions of team members.*

We distinguish between two modes of leadership, which we label "functional" and "visionary". Functional leadership operates within and reinforces existing structures, while visionary leadership operates to modify or transform structures. In the remainder of this section, we walk through each aspect of our model in turn.

3.1 A structurational perspective on leadership

We use structuration theory as a meta-theory (Giddens, 1984) to integrate findings from diverse streams of literature into a theoretical framework that addresses leadership in self-managing virtual teams. Structuration theory posits a recursive relation between team "structure", defined as the rules and resources that influence, guide or justify individual action, and the actions of those that live within and that help to create and sustain this structure.

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Numerous authors have used a structurational perspective to frame empirical analyses of team activities (e.g., Barley, 1986; Orlikowski, 1992) and in particular, the development of virtual teams (e.g., Sarker, Lau, & Sahay, 2001). We chose this framework because it provides a way to conceptualize how the behaviors of one team member might shape the actions of others even in the absence of traditional modes of authority, a key issue in our theorizing about leadership in self-managing virtual teams.

Structuration theory is perhaps best described as a meta-theory: that is, rather than identifying particular factors of leadership and their relations, it describes the form that such a theory might take. Specifically, structuration theory suggests that a theory of leadership in self-managing virtual teams should consider structure (i.e., rules and resources) and action in these teams and how the two are interrelated in different approaches to leadership. Structure matters because the development of shared structure enables team members to identify how to make effective contributions to the shared goal of the team and thus achieve team performance. In this way, structure may serve as a substitute for conventional leadership by guiding individuals' actions towards desired group outcomes. It is thus not a question of the presence or absence of structure, but rather its nature and the degree of agreement concerning structure among team members. Our emphasis on the role of structure is consistent with Kerr and Jermier (1978)'s substitutes for leadership theory, which suggests that a range of factors, such as an important task or organizational formalization, can substitute for the influence of a leader.

For our theorizing, we consider structure as comprising three kinds of rules and resources identified in prior work (Barley & Tolbert, 1997; Stein & Vandenbosch, 1996): (1) interpretive schema, (2) norms and rules, and (3) authority and control of resources (named in the original framework as structures of signification, legitimation and domination). For example, a team

member may follow a known process for a task (an individual action) because the individual believes that following that process is the accepted norm within the team (a structure). It should be noted that this division into three kinds of structure is an analytic convenience: in practice, they are overlapping and mutually reinforcing.

It might first appear that a consideration of leadership would be relevant primarily to an understanding the third form of structure, authority and control of resources, factors that would distinguish a leader in a traditional vertical power structure. However, as discussed above, leaders of virtual teams (if identified as such) often lack formal authority over members or control over resources. Discontinuities in the virtual environment lessen the ability to influence via traditional sources of hierarchical power and attempts to exert influence via these means may be detrimental to team dynamics and performance (Bligh, 2006; Hiller, Day, & Vance, 2006; Mathieu et al., 2008; Van der Vegt, Jong, Bunderson, & Molleman, 2010). And as Barley and Tolbert (1997) point out, control of resources does not necessarily equate to formal power to reward and sanction. For instance, knowledge-based power, in the form of specialized knowledge or expertise, is a kind of resource when the team is dependent on the specialized knowledge of a team member to assist in problem-solving.

We focus instead on the effects of the other two forms of structure, namely shared mental models and shared norms for behaviour. As noted in the prior section, extensive research on teams of all kinds has demonstrated that the degree of convergence or sharing of team member mental models is an important predictor of performance generally (DeChurch & Mesmer-Magnus, 2010b), that is, shared mental models help teams achieve shared goals. We suggest that these models are especially important in self-managing and virtual teams. The tendency for individuals to interpret tasks according to their own perspectives is exacerbated when working in

a virtual environment, with its more varied individual settings and less opportunity for informal discussion and mutual observation. Schmidtke and Cummings (2017) note specifically the need for more complex shared mental models in teams facing a higher level of virtualness.

Shared norms seem less studied, but also important. Howell, Bowen, Dorfman, Kerr, and Podsakoff (1997) suggest that organizational members receive task guidance from factors including professional norms and standards. Locke (2003) suggested a number of basic shared norms needed for team performances, such as commitment to work and respect for facts and reason. In a study of a small, geographically dispersed software development team, Ghosh, Yates, and Orlikowski (2004) identified the importance of norms for communication to facilitate team work. Similarly, Henderson, Stackman, and Lindekilde (2016) found a positive impact of communication norm alignment on performance and other group states. Pearce and Ensley (2004) found the importance of a team shared vision, a related construct. And contrariwise, in the absence of developed team norms, team members will draw on norms they have acquired in other settings to guide their actions, but these diverse norms may conflict and so not guide the team towards its shared goal.

In summary, we propose that leadership, that is, influence that guides team members towards the accomplishment of shared goals, is expressed in self-managing virtual teams in part through creation of shared mental models and of norms that guide the actions of team members, enabling them to work together effectively and to overcome challenges created by discontinuities. These models and norms are especially important in self-managing virtual teams in which members decide for themselves what they will do (and not do), based on discussion with other members and observation of what they are doing (and not doing) (Paoletti, Reyes, & Salas, 2019). In order to be able to contribute effectively, team members must have common

ideas about what is important to the team, the kinds of actions that are appropriate or necessary. As well, shared purpose and goals have been argued as a necessary condition for shared leadership (Carson, Tesluk, & Marrone, 2007). Although some research has considered the accuracy of mental models, we follow prior research on virtual teams that focuses on the importance of teams having overlapping mental models and norms (e.g., Ayoko & Chua, 2014; Maynard & Gilson, 2014). Accordingly, we propose:

Proposition 1: The extent of shared mental model and shared norm convergence will be

positively associated with effectiveness in self-managing virtual teams.

3.2 Broad functional leadership reinforces structure

If we accept that shared mental models and norms act as substitutes for leadership in self-managing virtual teams, the question then is how those models and norms are maintained and made salient to team members. While there has been extensive research on the impact of these forms of structure on effectiveness, there has been less attention on the mechanisms through which they are built (Maynard & Gilson, 2014, p. 12). The structurational perspective suggests that some actions taken by team members serve to reinforce existing structures, while others have the effect of creating and modifying structures. The key notion here is the "duality of structure," meaning that the structural properties of a social system are seen as both the means and the ends of the practices that constitute the social system. As Sarason (1995) explains, in structuration theory:

> *The central idea is that human actors or agents are both enabled and*
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> *constrained by structures, yet these structures are the result of previous*
>
> *actions by agents. Structural properties of a social system consist of the rules*
>
> *and resources that human agents use in their everyday interaction. These rules*

and resources mediate human action, while at the same time they are

reaffirmed through being used by human actors or agents. (p. 48).

Simply put, by doing things, members of a team create the way to do things. We therefore define *behaviour that influences other team members to make effective contributions to the team task, while working within and reinforcing shared mental models and norms* as functional leadership behavior.

Behavioral theories of leadership reviewed in the prior section have identified classes of behaviors that we view as associated with functional leadership, that is, leadership that reinforce shared mental models and shared norms. First, research has emphasized the importance of intragroup communication for shared mental models (e.g., He, Butler, & King, 2007; Kennedy & McComb, 2010). In support, in our review of virtual teams, we noted the recurrent finding of a relation between the amount of communications and perceptions of leadership. leader (Piccoli et al., 2004; Tyran et al., 2003; Yoo & Alavi, 2004). As well, we suggest that task- and relationship-oriented behaviours provide functional leadership when they work in the context of existing structures, drawing on them as resources to guide, legitimize, enable, and give meaning to these behaviors. Stewart and Manz (1995) identify similar leadership behaviors as those associated with the most significant long-term improvements in self-managing teams.

Finally, a key finding of research on virtual teams reviewed above was that contributing work to a project can be seen as a form of leadership. We argue that these contributions constitute an important contribution to leadership because being seen doing work reinforces shared mental models and norms, making them more salient and appropriate. For example, the norm of using a particular process for a task is not a given, but rather is the outcome of prior actions by team members. By visibly following the norm, members reinforce its legitimacy ("we

always do it this way"); by taking different actions (*e.g.*, skipping a step because it is seen to be too time-consuming or using a different approach because the accepted approach seems unable to deal with important problems), they undermine its legitimacy, perhaps eventually changing the norm. Paoletti et al. (2019) noted the importance of shared experiences as a basis for shared mental models; Fernandez et al. (2017) suggest using simulations for the same purpose. We suggest that having the work done by team members made visible via the information system linking them will have the same effect.

We turn next to the question of who performs the leadership behaviours. We propose that effective self-managing virtual teams will exhibit shared functional leadership. Our rationale is three-fold. First, research on face-to-face teams (e.g., Bales, 1950; Yukl, 2002) suggests that the same individual is unlikely to perform all functional leadership roles equally well. Second, teams that attempt to integrate diverse, specialized knowledge workers may require many different kinds of functional leadership in the form of varied substantive task contributions (Grant, 1996). Finally, in an agent-based model study, Dionne, Sayama, Hao, and Bush (2010) found that in the absence of high mutual interest, broad participation was needed for mental model convergence. In short, the nature of work in self-managing virtual teams creates a pressure for what we have labelled shared functional leadership. Relatedly, Stewart, Fulmer, and Barrick (2005) found that "teams exhibit higher task performance when members are consistent on social roles" (p. 357). We thus offer the following propositions:

Proposition 2: Distributed performance of functional leadership behaviours will be positively

associated with extent of shared mental model and shared norm convergence in self-

managing virtual teams.

3.3 Visionary leadership changes structure

The perspective described above takes a static view of team performance. To complete our model, we next consider initial development and changes in structure. We identify behaviors that create or change structures, i.e., new mental models or new norms for behaviour, as a kind of transformational leadership that we label "visionary" leadership. Visionary leaders help other team members make sense of the world in different ways and to develop new norms of behavior and new mental models to match changing needs. This view of leadership has been well supported empirically. Foldy, Goldman, and Ospina (2008) discussed how a leader was able to help members of an organization understand an important element of the organization's work. Reiter-Palmon, Herman, and Yammarino (2008) suggested that a leader can help a team form a shared mental model by providing a vision or encouraging discussion. Ayoko and Chua (2014) found that well-defined transformational leadership behaviors, as defined by Bass and Avolio (1994), were positively associated with development of shared mental models and that shared mental models mediated the relationship between transformational leadership and team efficacy. In a field study of 55 R&D teams, Reuveni and Vashdi (2015) found that through "long-term vision" (p. 679), transformational leaders helped heterogenous team members develop shared understandings. Finally, in an experimental study, Boies and Fiset (2018) found that two specific transformational leadership behaviours, intellectual stimulation and inspirational motivation, were effective in building shared mental models through the mediating effect of task and team-related communication. Shared norms seem less studied, though Taggar and Ellis (2007) gave an example of how a leader was able to increase the norm of collaborative problem solving in a group.

Given our definition of visionary leadership, we might ask whether change in structures is incremental or discontinuous. Advocates of double-loop learning (Argyris & Schön, 1978) believe that change in underlying structures is only possible when teams have consciously reflected on conditions eliciting a need for change, have surfaced the team's deep assumptions and beliefs, and engaged team consensus for change. In effect, double-loop learning theory requires that team members be consciously aware of team structures before they are able to change them. Before changes in theory-in-use (*i.e.*, the tacit structures that govern behavior) are possible, members "…require external references. There must be public representations of organizational theory-in-use to which individuals can refer…. These are the shared descriptions of the organization which individuals jointly construct and used to guide their own inquiry" (Argyris & Schön, 1978, p. 17).

In contrast to this highly rational, discontinuous change model, we propose that the structural change influenced by visionary leadership may sometimes also result from a more incremental, subconscious process. For example, a team's role structure may gradually evolve as the overall task is divided into pieces suitable for different kinds of participants. The job of coordinating task assignment is an example of functional leadership on a day-to-day basis, and much of this coordination will be distributed self-assignment (*i.e.,* individuals voluntarily taking on tasks for which they have particular skills or interest). However, as structure evolves, visionary leadership will call attention to and clarify the newly emergent structure and influence the team to embrace it. The process of consciously surfacing and describing underlying structures may be less necessary in virtual teams using information and communication technology to collaborate, because the transparent dialogues themselves, archived for subsequent

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viewing, become the external reference called for by Argyris and Schön (1978), the public representation of organizational theory-in-use to which individual members can refer.

As with functional leadership, we propose that self-managing virtual teams can exhibit a variety of visionary leadership behaviors, but in the case of visionary leadership, we propose that a more centralized or concentrated form of leadership (i.e., from a small core group) will be associated with effectiveness in the long run. Meta-analyses of shared leadership have found that shared "new-genre" leadership is related to success (Wang et al., 2014), but that category is much broader than the behaviours we describe as visionary. We argue that centralized visionary leadership will be more effective because of the need for clarity and agreement among team members about making changes to the structures that govern and constrain their behavior. As self-managing virtual teams progress in their work, to be effective, they must have a high degree of shared consensus about shared mental models and norms. This consensus is more likely to occur in teams in which centralized visionary leaders are able to clearly articulate a vision of these structures that is broadly embraced by all team members. Locke (2003) similarly argued that even in a setting with shared leadership, a top leader should retain control of setting a vision and establishing core values.

Empirical studies of self-managing teams support this view. Studies by Kayworth and Leidner (2002) and Piccoli et al. (2004) suggest that the most effective self-managing teams virtual teams were those in which one or two team members took the initiative to clarify team members' responsibilities and work process structures. McIntyre and Foti (2013) found in an experimental study of programming teams that teams that in which centralized leadership emerged in which the leaders mutually recognized each other "demonstrated significantly higher levels of team mental model similarity, team mental model accuracy, and team performance"

(p. 46). Eseryel (2014) found that while all team members provided some knowledge and leadership to the team, the core team members provided visibly more leadership regarding the resolution of critical issues, which were central to the success of the team. Accordingly, we offer the following proposition:

Proposition 3: Centralized performance of visionary leadership behaviours will be positively associated with extent of shared mental model and shared norm convergence in self-managing virtual teams.

A final question remains: How do those who are able to influence change in underlying team structures gain the influence to be able do so (*i.e.*, why do some member's actions change structures and others do not)? Indeed, studies of transformational leadership in virtual teams seem to suggest that it is less effective in this setting (Eisenberg, Post, & DiTomaso, 2019; Wong & Berntzen, 2019). However, these studies have examined with appointed leaders. We propose that the answer to our question lies in the nature of the interrelationship between functional and visionary leadership as we have defined them. DeRue and Ashford (2010) argued that leadership involves others accepting someone as a leader. We suggest that successful visionary leadership is action-embedded*,* by which we mean that visionary leadership derives its authority from substantive, action-oriented contributions that provide evidence to other team members of an individual's abilities and thus ability to lead, thus making their attempts to alter structure credible and effective. Accordingly, we propose:

Proposition 4: Individuals successfully performing visionary leadership behaviours will have previously performed a high-level of functional leadership behaviours.

4. **DISCUSSION**

We have presented a theory of leadership in self-managing virtual teams. We include ideas both from functional leadership in supporting a team's regular operations and from transformational leadership in what we have labelled visionary leadership, forms of leadership that influence changes in the structure that guides team behavior. We have proposed that effective self-managing virtual teams will exhibit a paradoxical combination of widely shared, distributed functional leadership complemented by strong, concentrated, and centralized visionary leadership. Finally, we have proposed that there is a relationship between functional and visionary leadership that evolves with continued team interaction.

4.1 Suggestions for future research

Our propositions were developed deductively from prior theory and empirical studies rather than inductively from systematic empirical observations. To support these propositions requires that they be systematically tested in future research. Our propositions both agree with and extend current research findings. Proposition 1 seems already well supported for the impact of shared mental models on team effectiveness (DeChurch & Mesmer-Magnus, 2010a). Our model suggest shared norms are also important though these seem less studied. Proposition 2 builds on prior work on shared leadership by adding the mediating variable of shared mental models and shared norms. As we do not argue that these variables completely moderate the relationship, future research could determine their relative impacts. Similarly, for proposition 3 research has examined shared mental models as moderating the impact of transformational leadership (Ayoko & Chua, 2014) but future research could examine shared norms and determine the relative size of effects. Finally, proposition 4 suggests a novel basis for emergence

of leader perception in self-managing virtual teams, namely the extent of substantive task contribution, and a specific impact, namely what we have called visionary leadership.

As well, the theory (like all theories) is only partial. Future research should extend the framework presented here by further exploring the antecedents, patterns and consequences of leadership in self-managing virtual teams. As with studies of emergent and shared leadership, we expect to see impacts from all kinds of leadership, with different importance in different circumstances. Another connection to examine are the connections among leadership, shared mental models and norms and motivational factors such as team empowerment (Burpitt & Bigoness, 1997; Kirkman & Rosen, 1999), as empowerment has also been shown to have a positive impact on virtual team performance (Kirkman, Rosen, Tesluk, & Gibson, 2004).

4.2 Methodological issues for future research

A variety of research approaches could be applied to study the processes of leadership in self-managing virtual teams (Walsh, 1995). The literature has demonstrated empirical techniques to measure the degree of convergence (DeChurch & Mesmer-Magnus, 2010b; Mohammed, Ferzandi, & Hamilton, 2010). Interview data would enable exploration of the team members' perceptions of the leadership process and allow direct comparison between different members' perceptions of structures, thus explicitly examining how these are developed. On the other hand, content analysis of the interactions between members of self-managing virtual teams would enable detailed analysis of the influence process as it unfolds (Fairhurst & Connaughton, 2014; Kennedy & McComb, 2010). Lastly, content analysis of the work being done will help with identifying the contribution of action to reinforcement and modification of structure. Such analysis infers the deep structures and processes from informed examinations of the artifacts that these surface level dialogues provide. This approach has the advantage of avoiding reliance on

the recollections of team members, which may degrade over time or be unreliable in other ways. Such research may be feasible in some cases. For example, many Internet-based collaborations maintain archives of their interactions that are publicly available and corporate virtual teams may have similar data that could be accessed. However, two guidelines for such research should be kept in mind. First, observations should be longitudinal and dynamic, carefully observing changes that occur over time. The phenomenon of leadership is inherently rooted in the passage of time and cannot be observed in a snapshot and a structurational process can only be seen through a longitudinal lens. Second, the unit of coding and analysis in such research should be the episode. Leadership is fundamentally an interaction process among team members, and such interactions are best observed episodically.

4.3 Managerial implications

This theory suggests specific actions that members of self-managing virtual teams can take to facilitate team functioning and to improve effectiveness. These include ensuring that all functional leadership functions are performed well, and preferably by many team members, in a decentralized and shared mode. It also suggests that there is value in centralized visionary leadership functions. Self-managing virtual teams might more explicitly recruit or select members who are particularly skilled at these functions and pay more attention to the on-going process of developing shared mental models and rules and norms. Since virtual work is increasingly common, educational programs for all kinds of workers might incorporate these ideas. For example, distance education classes that use technology support for instruction should provide instruction for students on the nature of leadership in self-managing virtual teams and thus set expectations for how the work can best be accomplished, as well as requiring team projects to provide an opportunity to practice these skills. We further suggest that it is important

for self-managing virtual teams to develop shared mental models and norms early in their

interaction. Shared mental models enable self-managing virtual teams to reach agreement

concerning the substance (i.e., the "what") of the team's work. Shared norms enable self-

managing virtual teams to more quickly develop agreement concerning the process (i.e., the

"how") of the team's work.

Whether these propositions are confirmed or disconfirmed by future research,

understanding how teams of independent knowledge workers can more effectively work in self-

managed virtual teams and virtual environments will improve both the traditional and non-

traditional organizations within which they exist. The results of the research we hope to stimulate

will then serve as a road map to improve organizational performance and foster innovation.

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