Organizing distributed knowledge for collaborative action: Structure, functioning, and emergence of organizational transactive memory systems
Schakel, J.K.

Citation for published version (APA):
Schakel, J. K. (2013). Organizing distributed knowledge for collaborative action: Structure, functioning, and emergence of organizational transactive memory systems Amsterdam: Vossiuspers UvA

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EXECUTIVE SUMMARY

In the domain of safety and security (such as e.g. organizing a response after a crisis, or fighting organized forms of crime) specialized organizations often have to collaborate on an occasional basis with other specialized organizations to head challenges that none of the participants can head (as easily) on its own (cf. Agranoff and McGuire 2001; Wastell et al. 2004). Such collaborations are assembled and dissembled per assignment, while the situation at hand mandates them to perform almost instantly. Another characteristic of such temporary collaborations is that they are often more or less virtual in nature, i.e. participants are distributed in time and space and depend on technology to communicate (Cramton 2001; Griffith et al. 2003).

In the literature temporary collaborations are being addressed from many different perspectives, including leadership (e.g. Jones and Hinds 2002), knowledge management (e.g. Rosenberg 2000), coordination (e.g. Bechky 2006; Faraj and Xiao 2006; Majchrzak et al. 2007), communication (e.g. McKinney et al. 2004), sensemaking processes (e.g. Weick 1990; 1993), and in terms of virtualness (e.g. Saunders and Ahuja 2006). One emerging theme is that of transactive memory systems (TMS). TMS are cognitive systems collaborating people develop to facilitate knowledge transfer and to contribute to people's abilities to coordinate specialized knowledge (Ren and Argote 2011). As such TMS support and are antecedent to the capabilities of an organization to combine its resources (Jarvenpaa and Majchrzak 2008). Developing an effective TMS may result in (new) organizational capabilities and services (Wang and Peng 2008), while failure to develop an effective TMS is known to be one of the most common barriers to distributed team success (Rosen et al. 2007).

Since the initial construction of TMS theory by Wegner and his colleagues (Wegner 1986; Wegner et al. 1991), TMS studies have flourished. There are, however, two important and repeated calls for research, which still received little attention. The first call for research concerns the level of analysis at which TMS are being studied. The
majority of TMS research takes dyads, triads, and (small) teams as their level of analysis – few studies are conducted at organization level. This hinders organizational TMS development efforts, because TMS-related findings at one level of analysis are often not applicable to other levels of analysis (Peltokorpi 2008). Consequently, several scholars call for TMS research at organization level (e.g. Jackson and Klobas 2008; Peltokorpi 2008; Ren and Argote 2011). The second call for research concerns the study of TMS in geographically distributed collaborations, because still little is known about short-term collaborations in real-life settings, how experiences in temporary collaborations impact future collaborations, what the effects are of management structures (as most studied collaborations were highly self-directing), and how technologies can help the group to develop a shared cognitive division of labour (cf. Cordery and Soo 2008; Kanawattanachai and Yoo 2007; Lewis et al. 2007; Powell et al. 2004; Ren and Argote 2011). In this dissertation these two calls for research are brought together based on the notion of Powell et al. (2004) and others (Moreland and Argote 2003) that organizational development efforts (read: organizational TMS development efforts) should provide for stable structures to enable future temporary and geographically distributed collaborations. Thus, the scientific motive of this dissertation is to increase our understanding of the structure, functioning, and emergence of organizational TMS, and understand its relation with the TMS of temporary and geographically distributed collaborations. Following this motive, the objective of this dissertation has been formulated as:

1. to develop organizational TMS theory as a lens to study how distributed knowledge resources may be involved in collaborations, which are temporary and geographically distributed, to head tasks that none of the participants can head (as easily) on its own, and
2. to identify which features of organizational TMS contribute to the robustness and resilience of these collaborations.

To reach this objective, three consecutive research projects were conducted, each guided by its own research question.

First, recognizing that knowledge in organizations may take on different forms, the first research question was how knowledge transfer
among (different types of) knowledge resources in an organizational TMS can be strengthened to support temporary and geographically distributed collaborations. Based on knowledge management literature three ideal types of knowledge resources were formulated at organization level: personalized, encoded, and embedded. The latter includes amongst others knowledge embedded in organizational structures, routines, processes, and technology. This explorative question was being studied using an action research approach. The results of the first study show that one way to develop organizational TMS is to organize for transactivity among resources of the same type, a second way is to transform resources from one type to another type, and a third way is to organize differently. Moreover, the first study illustrates how ICT and information-related methodologies provide opportunities to intervene in organizational TMS.

Second, because TMS are cognitive systems in the second study the question is examined how different types of knowledge resources, such as organizational structures and routines and technological information systems, should conceptually be related to TMS. To address the question TMS theory is extended by borrowing insights from organizational routines theory (cf. Pentland and Feldman 2008). Using this theory a mutually enabling and restricting relation can be distinguished between the shared mental representations of how the collaboration should function (called: the ostensive aspects of TMS) and the actual performances by specific people at a specific time and place (called: the performative aspects of TMS), while artifacts are represented as external factors which may influence or represent either of these aspects. Using an AR-approach the resulting theoretical lens is used to study and strengthen TMS in a large-scale policing operation. Next to formally including different types of knowledge resources in TMS theory, this study demonstrates that where TMS in organizations are interrelated, these relations can be described in terms of actors, artifacts, relationships, and type and content of interactions. With respect to strengthening organizational TMS the study illustrates that one way to intervene is to strengthen the ostensive aspects of organizational TMS, a second way is to develop artifacts to represent or influence the ostensive or performative
aspects of the organizational TMS, while a third way is to lock-in (i.e. automate) critical TMS components. The consequence of the latter, however, is that it reduces the ability of the organization to adapt and improvise. This effect may partly be compensated by increased efficiency.

The third research project is focused on the question how functionally structured organizations can develop their ability to occasionally engage in networked operations, in addition to their functional mode of organizing. Hybrid enactment is introduced to conceptualize the ability of an organization to switch dynamically between functional and networked enactment. These collaborations may be infrequent and brief, yet they are very common in e.g. law enforcement, crisis response, and the military. To develop a theoretical lens to study hybrid enactment the knowledge based theory of the firm (KBT) is combined with the concept of strategic, tactical, and operational levels of agency to develop a multilevel distributed systems perspective, while TMS-theory is used (and extended) to conceptualize mechanisms for achieving coherence. Using an interpretive case study approach a failed case of networked enactment is analyzed. Studying the TMS of the involved teams and that of the networked operation revealed (underdeveloped) TMS components and relations among these components. These elements are used to construct an organizational TMS model. This model reveals TMS-subsystems and direct and moderating effects among them. The model provides cues for strengthening organizational TMS (i.e. organizational learning), which contributes to increased opportunities for exploration and exploitation of distributed organizational knowledge resources, in order to head challenges that none of these resources can head on its own.