Competitive Paper

THE RELATIONSHIP BETWEEN ABSORPTIVE CAPACITY AND INTERNAL KNOWLEDGE TRANSFER CAPABILITIES

ABSTRACT

The capacity of knowledge worker teams to absorb and transfer knowledge enjoys considerable research attention. Our exploration attempts to construct an argument in support of the idea that that absorptive capacity may lead to improved transactive memory via the effectiveness of knowledge transfers. This pilot stage report on a larger and ongoing study broadens the scope for considering alternative routes to employ the absorptive capacity of teams operating in B2B environments. At the individual level, our results suggest that knowledge acquisition and assimilation is associated with higher level of knowledge transfer while structured and unstructured knowledge transfer seem to support the specialisation, credibility and coordination that drives transactive memory. Such an inference, build on stronger evidence, may proof that the performance of teams based on stronger transactive memory systems in business-to-business teams may be enhanced via the effect of improved absorptive capacity.

BACKGROUND

A growing body of knowledge that suggests firms can attain and utilize external knowledge for the development of competitive advantage drives the rapid development of absorptive capacity literature (Flatten, et al., 2011). The B2B marketing literature advances that firms are often seeking to identify, learn and absorb the new knowledge of possessed by their customers often exhibit enhanced innovation and competitiveness (Wang, Wu & Yang, 2013). Such knowledge sharing, explicit and tacit, is argued to be important for B2b supply chain visibility and strategic partnerships. Moreover, researchers increasingly demonstrates the association of absorptive capacity with key business-to-business aspects such a relationship capability (Tzokas et al., 2015) and collaborative innovation (Najafi-Tvani et al., 2018). Pivoting on the idea of knowledge complementarity, absorptive capacity suggests that the extent to which firms are exposed to knowledge in their environment influences the development of future capabilities (Zahra & George, 2002). Moreover, it is often alleged that such knowledge and the resulting learning flow largely from external information networks (Lofstrom, 2000). There is, however, evidence of internal knowledge sharing capabilities that could potentially benefit from the development of absorptive capacity, but very little literature is available to support this claim (Cenamor, et al, 2019; Chang & Gotcher, 2010). In particular, three knowledge sharing capabilities appear to play an important role:

First, experience as an antecedent of absorptive capacity (Zahra & George, 2002) is closely associated with organisational memory, which is a firm's knowledge repository (Walsh & Ungson, 1991). Such knowledge that is embedded in an organisation's employees is a source of value, and it seemingly often goes unrealised. To make full use of an employee's knowledge an organisation must facilitate the sharing and integration of the unique expertise that each employee owns (Nonaka & Takeuchi, 1995; Bachrach, et al., 2017; Martin & Bachrach, 2018) This knowledge utilization issue is addressed by research on transactive memory systems (TMS) as it explains "how team members develop, share, and efficiently integrate their expertise" (Lewis, 2004:1519). Thus, TMS is the cooperative division of labour for learning, remembering, and communicating relevant team knowledge (Hollingshead, 2001; Wegner, 1987).

Second, while TMS help team members to grow their specialised knowledge, it also allows them to "trust and rely on others' expertise" (Lewis, 2003:590). This leads to the claim that members are only able to develop specialised knowledge if they can trust others to remember task-critical information (Lewis, 2003). Team members who are familiar with each other, are likely to trust in them as an information source (Gruenfeld, et al., 1996). This notion suggests that trust between team members (interpersonal trust) may reduce the perceived ambiguity of the distribution of expertise among members and facilitate sharing of diverse expertise.

Third, the experience of individuals and of team members collectively, has been identified as an antecedent of absorptive capacity (Zahra & George, 2002). The literature also suggest that experience influences managerial cognition significantly, which may establish an organisation's ability to manage knowledge (Tripsas & Gaveitti, 2000). Internal social interaction patterns facilitate knowledge sharing (Zahra & George, 2002), and the nature and frequency of team communication (knowledge transfer) influences how effective TMS are in facilitating knowledge utilisation (Lewis, 2004). Thus, internal knowledge sharing effectiveness among knowledge worker teams may be a complimentary skill to the development of absorptive capacity.

Our study reports on the results of data collected from ten knowledge worker teams in a business-to-business contexts across various industries. We test a theoretical model to consider the relationship between absorptive capacity, knowledge transfer effectiveness and transactive memory systems. We commence with a short literature review before we describe the design of an exploratory study to empirically consider the relationship between the antecedents of these constructs based on a reflective measurement model.

ABSORPTIVE CAPACITY

Absorptive Capacity (ACAP) has become one of the most widely used and researched phenomena, especially in the field of strategic management. ACAP was conceptualised as a firm's ability to identify, assimilate and exploit knowledge gained from external sources, therefore facilitating the accumulation of knowledge (Cohen & Levinthal, 1989). Zahra and George (2002:186) expanded the original three dimensions of ACAP, (identification, assimilation and exploitation) and redefined the construct as "a set of organisational routines and processes by which firms acquire, assimilate, transform, and exploit knowledge to produce a dynamic organisational capability". They believed that these four capabilities (acquisition, assimilation, transformation and exploitation) more accurately represent the dimensions of ACAP and they also "play different but complementary roles" (2002:186) in explaining the influence that ACAP can have on business outcomes.

While acquisition refers to a firm's ability to identify and acquire knowledge from external sources, assimilation refers to the ability of the firm to develop processes and routines that make it possible for them to analyse, interpret, and understand knowledge that was externally obtained (Szulanski, 1996, Marabelli & Newell, 2014.). Therefore acquisition and assimilation are indicators of the potential absorptive capacity an organisation may have (Cohen & Levinthal, 1989). Transformation indicates a firm's capability to develop and refine those routines, which facilitates combining existing knowledge with the newly acquired and assimilated knowledge (Zahra & George, 2002). Exploitation, on the other hand, is the ability of a firm to leverage, refine and extend its existing routines, competencies, and technologies or to create something new based on the acquired and transformed knowledge (Flatten et al., 2011; Zahra & George, 2002). It follows that transformation and exploitation are indicators of the realised absorptive capacity of an organisation (Zahra & George, 2002).

In addition the Zahra & George (2002) conceptualisation argues that that knowledge sources complementarity and experience are key antecedents of ACAP. Relevant knowledge that has been previously acquired, thus prior knowledge, makes up the content of a firm's ACAP. How exposed a firm is to knowledge in its environment influence decision-making, as well as the development of future capabilities. Moreover, it is was shown that the intensity and span of the knowledge that the firm encounters, positively influences a firm's tendency to explore related and new knowledge (Van Wijk, Van den Bosch & Volberda, 2001). It is clear that "firms acquire knowledge from different sources in their environment, and the diversity of these sources significantly influences the acquisition and assimilation capabilities that constitute their" ACAP (Zahra & George, 2002:193). Knowledge complementarity is defined as the degree to which knowledge is linked to, but simultaneously distinct from the knowledge of other actors in the information network (Lofstrom, 2000). In addition Lofstrom (2000) also demonstrated that knowledge complementarity is positively related to a firm's learning (Lofstrom, 2000). In support, of this argument Zahra & George (2002:193) proposed that "the greater a firm's exposure to diverse and complementary external sources of knowledge, the greater the opportunity is for the firm to develop its potential ACAP". Past experiences of success lead firms to search for more information in those specific areas and successes. Past experiences also influence how a firm's acquisition capabilities develop in the future. Firms can gain experience through being exposed to, experiencing the impact of, and through obtaining knowledge of specific skills and capabilities. Firms can gain experience from 'learning-by-doing', facilitating the development of new routines, which influences the way a firm goes about searching for knowledge in the future. Therefore experience was proposed to influence the development of a firm's ACAP (Zahra & George, 2002).

The above-mentioned antecedents of ACAP (knowledge sources & complementarity and experience) are suggestive of quite a few internal knowledge sources that could potentially influence the development of ACAP. Researchers have demonstrated interested in how ACAP at the organisational level is influenced by the behaviour of individual role players as well as how ACAP applies to their social context (Hotho, Becker-Ritterspach & Saka-Helmhout, 2012). Social interaction in teams has been linked to how the components (acquisition, assimilation, transformation, and exploitation) of ACAP operates (Zahra & George, 2002). Also, research has establish that social interaction is essential for the development of ACAP at the organisational level (Hotho et al., 2012). Group problem solving requires vindication of new knowledge and mutual understanding, and such outcomes can only be produced in dialogue and social interaction (Yakhlef, 2010). The role of an individual team member as well as how new knowledge is understood internally remains unclear (Hotho et al., 2012). Based on these findings it is apparent that social interaction leads to ACAP in organisational teams. Numerous studies have been conducted to explain the phenomena of social interaction. One stream of enquiry which seem promising is that of Transactive Memory Systems (TMS).

TRANSACTIVE MEMORY SYSTEMS

While experience is an antecedent of ACAP (Zahra & George, 2002), it is also closely connected to organisational memory, which is a firm's knowledge depository (Walsh & Ungson, 1991). The product of experience, that is knowledge embedded in an organisation's employees, often goes unrealised as a source of value. To make full use of an employee's knowledge an organisation must facilitate the sharing and integration of the unique expertise that each employee owns (Nonaka & Takeuchi, 1995). This knowledge utilization issue is addressed by research on Transactive Memory Systems (Lewis, 2004). Basically, TMS explains "how team members develop, share, and efficiently integrate their expertise" (Lewis,

2004:1519). Lewis (2003) states that there is a renewed interest in the knowledge processes of teams and TMS is very useful in understanding these knowledge processes. A TMS is the cooperative division of labour for learning, remembering, and communicating relevant team knowledge (Hollingshead, 2001; Wegner, 1987). Lewis (2003) explains that Wegner (1987) noticed how members in groups relied on each other to obtain, process, and communicate information from differing spheres of knowledge. Wegner (1987) called this 'system of cognitive interdependence' a TMS. According to transactive memory theory, team members divide the cognitive work that needs to be done and allocates it to the members specialised in that specific sphere of work. To collectively have all the information necessary to perform the task, they trust each member to take responsibility for their specific area of expertise. This dependence on each other gives individual members the freedom to develop their sphere of expertise to a deeper level, while still having access to the other member's 'task-relevant' information. TMS facilitate the quick and easy transfer of specialised, internal knowledge which causes a greater amount of 'task-relevant' information to be at the team's disposal (Martin & Bachrach, 2018). Not surprisingly, TMS is argued to enhance the performance of groups and will therefore also have a positive effect on team decision making (Lewis, 2003).

Transactive memory is "memory that is influenced by knowledge about the memory system of another person" (Lewis, 2003:588). A transactive memory system "describes the active use of transactive memory by two or more people to cooperatively store, retrieve, and communicate information" (Lewis, 2003:588). Group transactive memory is therefore made up of the combination of the individual member's sphere of competence and of what members know about and associate with the other 'member-expertise'. Research has shown that TMS's can be discerned from the specialization ("differentiated structure of members' knowledge"), credibility ("members' beliefs about the reliability of other members' knowledge"), and coordination ("effective, orchestrated knowledge processing") capabilities of a team (Lewis, 2003:589). These three manifestations (specialised knowledge, credibility perceptions, and coordinated processes) are considered the dimensions of TMS (Lewis, 2003).

For a knowledge-worker team to perform well, they need to have the ability to "elicit, utilize, and integrate" the specialised knowledge of each member (Lewis, 2004:1529). Past research on TMS's advocates that developing a TMS in an organisational management team could promote such knowledge processes. But, very little research has been done on how the presence of TMS's in a knowledge worker are being influenced by the development of the ACAP of that team.

Research on how transactive memory works has established that interpersonal interactions are required to retrieve the memory that different members of a team may possess (Lewis, 2003). While TMS's help team members to grow their specialised knowledge, it also allows them to "trust and rely on others' expertise" (Lewis, 2003:590). This leads to the claim that members are only able to develop different specialised "knowledge if they can rely on (trust in) others to remember other task-critical information" (Lewis, 2003:590). Moreover, transactive memory systems, driven by social interactions among members, can enhance knowledge transfer effectiveness that may lead to improved team performance (Bunger, Doogan, Hanson & Birken, 2018, Lewis, 2004).

KNOWLEDGE TRANSFER EFFECTIVENESS

The experience of individuals, and of a team's members collectively, has been identified as an antecedent of ACAP (Zahra & George, 2002). Experience influences managerial cognition significantly, which, in the end, contributes to establishing an organisation's ability to manage

knowledge (Tripsas & Gaveitti, 2000). Internal social interaction patterns facilitate knowledge sharing (Zahra & George, 2002), and the nature and frequency of team communication (knowledge transfer), influences how effective TMS's are in facilitating knowledge utilisation (Lewis, 2004). Also, it has been demonstrated that ACAP influences the transfer of knowledge between organisations (Gupta & Govindarajan, 2000).

Zahra and George (2002), suggest that there is an effectiveness factor that influences knowledge transfer, and posits that it implies organisations differ in their capacity to generate value from their knowledge. Such Knowledge Transfer Effectiveness (KTE) can be challenging to achieve (Argote, 1999; Chen, Sun & McQueen, 2010) and appears to include two types, structured and unstructured knowledge transfer. Shen, Li and Yang (2015) confirmed that Structured Knowledge Transfer (SKT) and Unstructured Knowledge Transfer (UKT) can "leverage searching, learning, practice, and integration" (Shen et al., 2015:487) to help organisations achieve better knowledge transfer effectiveness.

Structured Knowledge Transfer is defined as "regulating the transfer activities within an organisation so that they are in accord with the expectations established in policies, plans, and targets" (Child, 1974:177). Thus, it involves the direct transfer of knowledge, in formal, planned processes (Chen et al., 2010). But, using only structured forms of knowledge transfer could restrict spontaneous, active learning (Shen et al., 2015) and therefore the unstructured knowledge should also be considered. Unstructured Knowledge Transfer "is an informal, unplanned process that entails creating opportunities, options, and channels for knowledge transfer and keeping knowledge systems open" (Chen et al., 2010:230 & Shen et al., 2015:488). Therefore UKT is a system that is mainly based on social and cultural connections (Katila & Ahuja, 2002), which makes it the more casual form of knowledge transfer (Shen et al., 2015). SKT and UKT are key determinants in establishing better knowledge distribution, improve how genuine the knowledge transfer is, as well as promoting knowledge 'socialisation' (Shen et al., 2015). Not surprisingly it has also been shown that SKT and UKT positively relate to KTE (Shen et al., 2015).

HYPOTHESIS DEVELOPMENT

From the above-mentioned literature, we argue that transactive memory systems are driven (at least in part) by absorptive capacity and knowledge transfer effectiveness at the individual level. The capacity of the individual to absorb knowledge by acquiring (acquisition) and assimilating the knowledge and then use the knowledge to transform and exploit situations and/or events is key to the transfer effectiveness of the knowledge. This we propose is the case for both structured and unstructured knowledge transfer effectiveness and in particular relevant in knowledge intensive domains (Shen et al., 2015). In addition we argue that the transfer effectiveness of knowledge is import to transactive memory systems as it facilitates specialisation, improve the credibility perceptions of members, and also facilitate the potential for improved coordination.

Our position is a departure from the conventional thinking on transactive memory systems which often consider the construct in moderating (Bachrach, Mullins, & Rapp, 2017) or mediating (Xiao-na, Gang, & Guo-liang, 2013) roles. Our position also contradicts the findings of (Huang & Huang, 2007), who showed that TMS facilitate knowledge sharing and that knowledge sharing has no effect on KTE. However, or position is consistent with the findings of (Miller, McAdam, Moffett, Alexander, & Puthusserry, 2016) who showed that human, organisational, relational and network factors influences the ability of stakeholders to engage in knowledge management driven by the effectiveness of acquisition, assimilation,

transformation and exploitation. We also derive support from (Omidvar, Edler, & Malik, 2017) who demonstrated that in order to enhance effectiveness of knowledge transfer R&D consortia need to develop strategies that supports absorptive capacity development. Based on this insight we constructed a theoretical model (Figure 1) to explore the relationship between ACAP, KTE and TMS.

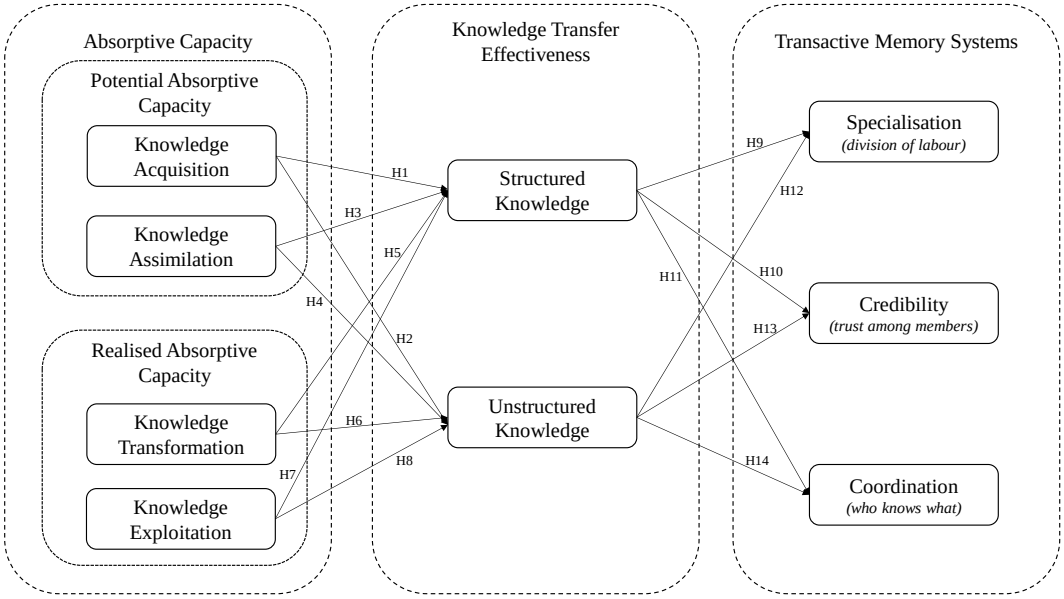

Figure 1: Theoretical Model

METHODOLOGY

We used a non-probability approach to survey ten Knowlegde-Worker Teams (KWT) across a variety of industries and organisations in South Africa. Thus, we assume that the performance of a KWT relies heavily on the knowledge and expertise of its members. Examples include consulting teams, product development teams, research teams, other cross-functional and project teams (Lewis, 2004). The main purpose of a KWT is to use members' unique expertise to generate new knowledge (Nonaka & Takeuchi, 1995). They are therefore structured deliberately to fulfil this purpose. How well a KWT perform relies on the willingness and effectiveness with which members share their specialised expertise and integrate this knowledge among the members (Lewis, 2004). A KWT's value can, however, only be realised for the organisation when members of the team thoroughly exploit their own unique competencies and fully exploit the specialised knowledge of the other members (Nonaka & Takeuch, 1995). Data was collected via physically distributing a paper based questionnaire to the members of the selected KWT. Items were measured using a 7-point Likert scale ranging from 1 (Completely Disagree) to 7 (Completely Agree). The four dimensions of ACAP (acquisition, assimilation, transformation and exploitation) were measured using a context adapted scale by (Flatten, Engelen, Zahra & Brettel, 2011). The measurement of Transactive Memory Systems employed the scale by Lewis (2003) as it is consistent with the original conceptualisation of TMS's by Wegner (1987) and reflects transactive memory itself, together with "the cooperative processes illustrative of transactive memory use" (Lewis, 2003:590). In addition, the Lewis (2003) scale is suitable for use in field settings, practical to manage and appropriate to several differing groups or tasks. Knowledge Transfer Effectiveness scale items were based on Shen et al. (2015) and incorporated both structured and unstructured knowledge transfer elements.

RESULTS

The ten KWT's yielded 114 useable responses, with the smallest team containing six member and the largest team containing 26 members. Most of the respondents were females (60%) and most (60%) were between the ages of 20 to 30 years with the category 18-20 years being the second largest (19%). Importantly, 83% of the respondents reported that they are involved in the current team for five years or less. The scale items were subjected to variance based SEM using SmartPLS3 (Ringle, Wende & Becker, 2015). Of the 36 items 4 items were removed because of poor loadings ($\beta<0.7$) according to the recommendations of Hair, Hult, Ringle & Sarstedt (2017). Inspecting the cross loadings matrix conformed that all items loaded on their respective latent constructs, demonstrating good convergent validity. The reliability of the the measurement scale (Table 1) was also confirmed with no Chronbach alpha coefficient lower than 0.7 with the exception of acquisition which was 0.629 and considered acceptable (Malhotra, Birks & Wills, 2013).

Table 1: Reliability and Validity diagnostics

	Cronbach's Alpha	Composite Reliability	AVE
ACQUIS	0.629	0.844	0.730
ASSI	0.782	0.859	0.605
COORD	0.868	0.904	0.655
CRED_	0.818	0.879	0.647
EXPL	0.775	0.870	0.691
SKNOW	0.835	0.900	0.751
SPES	0.652	0.795	0.567
TRANS	0.825	0.883	0.654
UKNOW	0.748	0.838	0.564

The measurement model also exhibit good discriminant validity with AVE' scores above 0.5 (Table 1) and satisfactory compliance with the Fornell & Larcker (1981) and the Heterotrait-monotrait criteria by Henseler, Ringle, & Sarstedt, 2015 (Henseler, Ringle, & Sarstedt, 2015) shown in Table 2.

Table 2: Discriminant Validity of the Measurement Model

Fornell & Larcker Criteria *(Sqaured AVE on diagonal)*

	ACQUIS	ASSI	COORD	CRED_	EXPL	SKNOW	SPES	TRANS	UKNOW
ACQUIS	**0.854**								
ASSI	0.484	**0.778**							
COORD	0.528	0.532	**0.809**						
CRED_	0.406	0.341	0.547	**0.804**					
EXPL	0.464	0.465	0.370	0.201	**0.831**				
SKNOW	0.337	0.455	0.371	0.157	0.499	**0.866**			
SPES	0.389	0.433	0.388	0.298	0.293	0.245	**0.753**		
TRANS	0.545	0.544	0.458	0.350	0.529	0.403	0.444	**0.809**	
UKNOW	0.472	0.518	0.469	0.459	0.269	0.337	0.334	0.428	**0.751**

Heterotrait-Monotrait criteria

	ACQUIS	ASSI	COORD	CRED_	EXPL	SKNOW	SPES	TRANS
ASSI	0.683							
COORD	0.710	0.622						
CRED_	0.549	0.404	0.644					
EXPL	0.663	0.591	0.437	0.234				
SKNOW	0.463	0.558	0.413	0.189	0.600			
SPES	0.561	0.563	0.455	0.360	0.367	0.308		
TRANS	0.770	0.676	0.528	0.393	0.665	0.471	0.532	
UKNOW	0.658	0.663	0.549	0.557	0.326	0.405	0.407	0.506

We employed the full collinearity assessment approach proposed by Kock (2015) to test for common method bias, and considered the variance inflation factor (VIF) scores for each latent variable separately. These observations allowed us to conclude that it is unlikely that common method bias influences our results – as all the factor level VIF scores were below the 3.3 benchmark. The satisfactory performance of the measurement model allowed for consideration of the structural model and the hypothesised relationships between constructs (Table 3).

Table 3: Structural Model results

		B	t-statistic	p value
H1	ACQUIS -> SKNOW	0,018	0.174	0.862
H2	ACQUIS -> UKNOW	0,267	2.470	0.014
H3	ASSI -> SKNOW	0,247	2.152	0.032
H4	ASSI -> UKNOW	0,357	3.163	0.002
H5	TRANS -> SKNOW	0,083	0.728	0.467
H6	TRANS -> UKNOW	0,138	1.093	0.275
H7	EXPL -> SKNOW	0,331	3.100	0.002
H8	EXPL -> UKNOW	-0,094	0.965	0.335
H9	SKNOW -> SPES	0,149	1.347	0.178
H10	SKNOW -> CRED_	0,003	0.036	0.972
H11	SKNOW -> COORD	0,240	2.511	0.012
H12	UKNOW -> SPES	0,284	2.238	0.025
H13	UKNOW -> CRED	0,458	7.220	0.000
H14	UKNOW -> COORD	0,388	3.685	0.000

The results (Table 3) shows that H1, H5, H6, H8, H9, and H10 is not supported by the data. However, our results show support for the relationship between acquisition of knowledge and unstructured knowledge transfer effectiveness (H2), while the relationship between knowledge assimilation and both structured (H3) and unstructured (H4) is also supported. Somewhat unsurprisingly the data also support the relationship between knowledge exploitation and structured knowledge transfer effectiveness (H7). Perhaps the most encouraging aspect of the results is the positive and statistically significant results that associates unstructured knowledge transfer with transactive memory systems, in support of H12 (specialisation), H13 (credibility), and H14 (coordination). Similarly H11 is also supported, illuminating the relationship between structured knowledge transfer effectiveness and knowledge coordination capacity.

DISCUSSION

Our results suggest that and alternative conceptualisation of the relationship between absorptive capacity, knowledge transfer effectiveness and transactive memory systems is indeed conceivable. This implies that transactive memory can benefit from increased absorptive capacity and enhanced knowledge transfer effectiveness. However, these benefits may vary between the type of knowledge transfer that the firm seeks to achieve – such as structured versus unstructured knowledge. Such a notion may suggest the existence of interaction effects that should be tested in more comprehensive studies. In addition, the current study is only exploratory in nature and limited to main effects, based on a small sample. Bigger samples and more parsimonious models may yield more reliable results. Therefore, the recent attention to transactive memory systems in B2B literature is poised with opportunity.

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