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Classification framework of knowledge transfer issues across value networks

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Abstract

Co-creating integrated solutions with customers requires collaboration of different partners within a value network. In this emerging context, knowledge is considered as a foundation for value co-creation. Therefore, identifying different types of issues, with which value network actors in knowledge transfer are confronted, is conceived as a first step toward, on the one hand, the prevention of the failure of knowledge exchange initiatives in a network, and on the other hand, the enhancement of the collaborative process of knowledge sharing. This requires shifting the conventional approach on knowledge transfer issues from an intra-organizational to an inter-organizational network. This paper aims to systematically identify and classify knowledge transfer issues with both tacit and explicit knowledge considerations. In doing so, we have first conducted a systematic literature review to identify issues. Secondly, these issues have been classified into six main categories and 29 subcategories through a structured classification approach. The proposed classification framework provides a comprehensive and wide spectrum of possible issues related to knowledge transfer within a value network. It also presents a step towards an improved awareness of such issues in order to resolve problems in transferring knowledge in such contexts.

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Keywords: Knowledge transfer; Tacit and explicit knowledge; Issues; Value network;Co-creation; Systematic review; Metaplan technique;

1. Introduction

In value networks, value is no longer created only within firms' boundaries, but is also co-created among various actors of a network [1]. We define a value network as the set of actors, i.e. multiple suppliers and customers, which collaborate with each other and integrate their resources and knowledge to co-create value through offering integrated solutions. In this context, knowledge is seen as a primary source of value co-creation and differentiation from competitors [2, 3]. Since knowledge is dispersed around networks, transferring and aggregating it from scattered sources and facilitating its seamless flow, are important tasks in a knowledge management initiative within value networks [4, 5].

Despite the fact that knowledge transfer has received considerable attention in recent years in the context of value networks, it often faces issues [6]. Such issues are hindrances to seamless knowledge sharing among actors, resulting in significant wasted time and resources for each member of the value network [7]. Thus, identifying issues in relation to knowledge transfer across a value network is important in undertaking knowledge transfer efforts.

Currently, issues of knowledge transfer across a value network are not well studied. This paper, based on a systematic review of the literature, identifies knowledge transfer issues (KTIs), classifies them in a structured way, and proposes a classification framework. In addition, issues related to both tacit and explicit knowledge are considered. This study aims to provide a well-structured theoretical basis for providing solutions that tackle issues of knowledge transfer across value networks. Accordingly, this paper addresses the research question: what are the issues related to transferring both explicit and tacit knowledge within value networks?

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This paper contributes to the literature on knowledge transfer in a value network in three ways: first, compared to existing classifications of KTIs, the proposed classification framework identifies, classifies, and integrates prior findings on KTIs in one single framework; second, as it covers both tacit and explicit knowledge transfer issues it represents a more comprehensive picture of KITs; third, it identifies and classifies KTIs in a well-structured way. The remainder of the paper is structured as follows. Section 2 provides overview on research background. Section 3 details the research methodology. Research execution is explained in Section 4. Then Section 5 presents a classification framework. Discussion and conclusion are found in sections 6 and 7.

2. Theoretical background

Knowledge transfer is a crucial condition for obtaining effective collaboration among actors of a network [8]. In a value network, knowledge transfer refers to the process by which actors share knowledge among themselves through ongoing interactions [9]. In such settings, the aim of knowledge transfer initiatives has shifted from improving product innovation and operational efficiency toward enhancing the customer experience by using integrated solutions [10]. Here knowledge is collaboratively created and transferred through iterative and mutually interactive processes among the actors—including customers—that are involved in the value co-creation process [11].

Nevertheless, knowledge transfer within a network may encounter certain issues. According to Pirkkalainen and Pawlowski [12], issues are "any barrier, challenge, or problem that might prevent or hinder a single person, a group, an organization, or a network of firms from reaching an objective and achieving success in a specific context, when the challenge is related to acting or working in a collaborative cross border setting."

Since research on investigating KTIs in a value network is still underdeveloped, we also searched within the wider literature of KTIs in business networking (BN) to find relevant information that can be useful to our research. We use the term "BN" to denote any form of inter-organizational collaboration (e.g. supply chain, collaborative network, alliance, virtual enterprise, virtual enterprise) in order to achieve a common or consistent goal.

In current literature on KTIs within BN, several studies have identified issues. However, the results are quite mixed. In some studies, high-level classes of issues are introduced and their focus is limited to a small set of issues; in others, a more detailed approach is applied [13]. For example, Cramton [14] identified five types of problems constituting failures of shared knowledge among partners in collaborative settings; Haug et al. [13] investigated information quality barriers and identified 12 issues; and Lin et al. [15] identified 18 barriers and classified them into 5 categories. Furthermore, different classification frameworks have been also developed, but researchers diverge in their KTIs classification frameworks[6, 12, 13, 16-18] or there is a lack of clarity about the process of developing a framework [19, 20]. In addition, transferring tacit and explicit knowledge encounters different issues, so they require different considerations. However, little research considers both issues simultaneously [6].

In summary, although such studies provide useful insights, they depict only a partial picture as they either focus on specific issues (e.g. [7, 21]) and fail to consider a wide variety of issues, or their focus is separately on tacit or explicit KTIs (e.g. [22, 23]). Therefore, little is known about KTIs in a more comprehensive classification framework. Therefore, to fill these gaps, this study aims to identify and classify issues related to both explicit and tacit knowledge in a structured manner. To do so, the initial list of KTIs will be systematically identified from current literature on KTIs. Then by applying a structured classification approach, a classification framework will be proposed.

3. Research methodology

We followed systematic processes in identifying and classifying issues relating to knowledge transfer across networks. Although a co-creation value network is the context of this research, there is a lack of research on KTIs in this context. Two options to investigate KTIs in value networks exist. The first is to follow a grounded theory approach and conduct exploratory case study research to identify KTIs from practice. However, since a value network is an emerging field, finding proper cases that have rich experience of long-term collaboration with multiple partners and co-creation with customers is difficult. It is likely the results would be based more on people's ideas than on their real experience. The second option is to investigate issues in other relevant literature in a related field (i.e. KTIs in business networking), but that requires context-related verification of the theoretical classification framework. A value network is regarded as a specific type of BN in which customers are considered as one among other actors in collaboration in order to achieve a common goal (i.e. co-creation value). Therefore, the types of KTIs from the BN research field are still relevant within value networks. Consequently, we selected the second option. However, literature on KTIs within BN is still fragmented and a clear consensus among various research findings has not yet been realized. As a result, in this paper (as the first step of two-phase research) we focused on identifying and classifying knowledge transfer issues within BN in a structured way.

Our research methodology included two phases, a systematic review and a structured classification approach. In phase one, we conducted a systematic review (SR) to identify current literature on KTIs in BN, following the guidelines of [24]. KTIs can disrupt the performance of a BN, so they must be recognized and receive a proper response. In this respect developing a KTI classification framework covers a comprehensive list of tacit/explicit knowledge issues which can offer a well-structured theoretical basis to solve issues and improve knowledge transfer across a network. This motivated us to conduct an SR. Subsequently, in a review protocol a search strategy was defined, as well as a set of keywords (Table 1) that included a number of synonyms. To accomplish the search, keywords were combined by Boolean operators. The Emerald, Elsevier, Wiley, IEEE, and Springer databases were selected, as they cover many publications in this field and are often used in such studies [13].

Given the feasibility concerns of searching separately in many databases (256 search queries in five databases), we planned to execute a simultaneously search within these

databases using Google Scholar (GS).

Table 1- keywords used in systematic review

Explicit knowledge *or* Tacit knowledge *or* Data *or* Information	*And*	Transfer *or* Exchange *or* Sharing *or* Flow	*And*	Issue *or* Challenge *or* Barrier *or* Problem	*And*	Supply chain *or* Collaborative network *or* Alliance *or* Inter-organization	

Repeated evaluations of GS have demonstrated its ability to deliver results equivalent to those provided by traditional computerized bibliographic methods [25]. Several investigations show that GS can identify sufficient literature [25-27]. However, GS delivers many sources. Therefore, to reduce search space we introduced stop criteria. We stopped to review when in 5 pages after first 20 pages no keywords were found; otherwise we continued up to the next 5 pages. A set of inclusion/exclusion criteria were also defined. We selected articles focused on both KTIs and one kind of business networking, with the further provision that they must have published in 2000-2015 in English language peer-reviewed publications. Articles were excluded if KTIs were only one among its topics, or if KTIs were examined from a single firm perspective rather than inter-firm collaboration in a network. Based on these criteria, a final set of papers was selected for full review and data extraction. In data extraction we designed a card for collecting data. This included a title of the issue, the explanation of the issue as described in the source, and publication information.

To synthesize this mixed data, we developed a classification framework. To classify the large list of identified issues, we needed to follow a structured classification approach. The advantage of classifying a large list of issues is that by size reduction and concisely described categories, the issues can be evaluated at a higher abstraction level [28]. Therefore, in phase two, the Metaplan technique was applied to classify the identified issues. The technique provides a structured classification process, requiring at least four researchers [29]. The final categories of knowledge transfer issues emerged through several Metaplan sessions. In the end, definitions per category were also provided to describe the set of issues belonging to each category.

4. Research execution

By performing an SR, this paper integrated existing literature on KTIs within the context of BN. An extensive literature search was performed to identify initial sources. A search process was resulted in 6720 initial sources, for which, after deleting duplicates, the titles and abstracts were reviewed based on inclusion and exclusion criteria. 54 papers were selected for full review and data extraction. From the data extraction process, 340 issues including 135 explicit and 215 tacit knowledge issues were identified and data extraction cards were filled. After removing duplicates, a total of 268 KTIs remained for developing a classification framework through Metaplan sessions. During the Metaplan sessions, the data extraction cards were used. Categories were formed by group members grouping similar concepts together [30]. Once consensus was reached, issues were categorized. We performed 2-round Metaplan sessions per type of knowledge, gleaning 27 and 22 categories for tacit and explicit knowledge transfer issues, respectively. This made initial classification easier. Seven issues were removed from these categories as being too general or not having a clear meaning. Then the next two rounds were performed to combine the results of the previous rounds. During the sessions some categories were merged. Some categories were divided into more specific categories and some categories remained unchanged. Changes of issues and categories were documented. Consequently, 29 categories emerged. Some levels of similarities among categories remained. Hence, in the final Metaplan session, we defined six main categories that represented higher order concepts and captured the underlying commonalities among the 29 subcategories. Having developed the final categories, we defined general descriptions for the resulting categories. Metaplan sessions were as objective as possible, with open discussions in which all group members felt free to give their opinion. This was done to avoid a bandwagon effect[31].

Regarding research reliability and to avoid individual bias, two researchers extracted data from articles individually and after that compared their results in group discussions together with other two research members. Conflicts -that did not occur often- were discussed to reach agreement. The consistency of the results demonstrates their reliability. In the final session for describing categories, we followed the same approach. In addition, we followed a well-structured process in the KTIs' identification and classification phases, and we documented and clearly explained them in a transparent and structured way. Regarding research validity, two researchers triangulated their findings. Also the research group members were all familiar with the context and issues, so they provided well-reasoned arguments for why an issue should be placed in a particular cluster. These enhanced the internal validity of the findings. Part of external validity was already done in the way that we set up our research. As this framework based upon prior research it represents a generalization from theory (existing literature). Further validation can be done by conducting empirical research.

5. Research results- KTIs classification framework

The proposed classification framework (Table 2) integrates the identified issues, classifies them into six main categories and 29 subcategories. The main categories are separated and complement each other and they capture the underlying commonalities among 29 subcategories.

The six main categories are labelled as structural network issues, generic issues, social issues, language/understanding issues, organizational issues, and technical issues. A brief description of each of the 29 subcategories (subcategories of the six main categories) is also provided below.

1. Transactive memory issues: Refers to the set of knowledge possessed by group members coupled with an awareness of who knows what.

2. Complex network issues: Extreme complexity in terms of relationships, communications, and use of knowledge.

3. Relationship issues: Collaborations between actors are hindered because of personal relationships. One firm feels superior over the other.

Table 2 - Classification framework of knowledge transfer issues

category	subcategories	sources
Network structure issues	Transactive memory issues	[32-34]
	Complex network issues	[35]
	Relationship issues	[15, 16, 20, 22, 36, 37]
	General distance issues	[12, 19, 38, 39]
	Cultural distance issues	[12, 16, 18, 19, 38-42]
	Lack of communication facilities	[12, 18, 43]
Generic issues	Difficulty in expressing tacit knowledge	[22, 43]
Social issues	Knowledge source reliability issues	[44, 45]
	Fear of losing knowledge	[18, 21, 42, 44, 46-48]
	Lack of willingness	[6, 12, 18-20, 37, 40, 43, 44, 46, 49-54]
	Lack of trust	[6, 17, 19, 21, 23, 35, 43, 49, 51, 54, 55]
Language / understanding issues	Insufficient mutual understanding	[6, 18-20, 44, 45, 50, 56]
	Contextualization issues	[12, 14, 34, 57, 58]
	Semantic issues	[12, 18, 34, 41, 42, 45, 46, 50, 57 59, 60]
Organizational aspect issues	Organizational issues	[12, 13, 18, 43, 51, 56, 60-62]
	Lack of top management commitment	[13, 39, 43, 63]
	Network level objective/benefit issues	[6, 23, 46, 51]
	Insufficient resources	[7, 12, 13, 18, 21, 43, 46, 51, 63, 64]
	Organization structural issues	[6, 18, 19, 35, 46, 51, 54]
	Lack of incentive	[12, 13, 18, 44]
	Authorization / data flow	[7, 14, 46, 51, 53, 61, 63, 65]
	Performance measurement issues	[23, 51, 61]
	Legal issues	[6, 12, 48, 58]
Technical issues	Failure to meet technological demand	[7, 12, 13, 21, 43, 44, 51, 61, 64]
	Lack of user-friendly IS	[6, 13, 47]
	Data quality issues	[6, 7, 23, 47, 61]
	Data overload issues	[13, 46]
	Data security issues	[7, 12, 18, 21, 43, 66]
	Data integration issues	[6, 7, 12, 17, 18, 23, 43, 46, 51, 59, 61, 63]

4. General distance issues: Physical or time distance between actors creates difficulties in knowledge sharing.
5. Cultural distance issues: All actors must know each other's respective cultural backgrounds. Views and ideas can be negatively influenced by not knowing languages people speak, their habits, and what is acceptable and what is not.
6. Lack of communication facilities: Lack of opportunities for communication and lack of formal/informal mechanism, making it difficult to transfer knowledge across a network.
7. Difficulty in expressing tacit knowledge: People are unable to externalize/codify their tacit knowledge.
8. Knowledge source reliability issues: Knowledge is not perceived as true because its source is unreliable.
9. Fear of losing knowledge: Since knowledge is a source of competitive advantage, there is fear that when it is shared, it is shared with partners that could be competitors.
10. Lack of willingness: People don't want or are unmotivated to engage in knowledge sharing for reasons including knowledge as a power syndrome, lack of trust in people, resistance to change, or fear of exploitation.
11. Lack of trust: A belief that the other party might act opportunistically or in an unfavourable way hinders knowledge sharing across a network.
12. Insufficient mutual understanding: Unable to make good use of the others' knowledge due to a lack of common ground, casual ambiguity, difference in perception, or lack of knowledge of exactly how the knowledge is supposed to be used.
13. Contextualization issues: Context can be defined as information about the situation, intentions, and feelings about an issue or action. Losing the context of knowledge can be an issue, especially for tacit knowledge.
14. Semantic issues: Use of different terminology or different meanings of words can cause misunderstanding.
15. Organizational issues: The organization does not have sufficient formal planning, guidelines or regulations for knowledge sharing. This makes it unclear who is responsible, and what and how data should be shared.
16. Lack of top management commitment: Due to lack of top management commitment and involvement, knowledge sharing initiatives lack a mandate, causing them to fail.
17. Network level objective and benefit issues: Given power asymmetry and goal problems at the network level, actors do not equally benefit from knowledge sharing.
18. Insufficient resource: Lack of resources such as expertise, training, time, funds, and network structure cause difficulties for knowledge sharing.
19. Organization structural issues: Inflexibility results from excessive hierarchy and centralization, or too many guidelines and regulations. People may be willing to share, but lack the authorization.
20. Lack of incentive: People are not motivated to share their knowledge due to a lack of incentives in the form of accolades or rewards.
21. Authorization / data flow: Data exists but is not mobile. People cannot access it and therefore they cannot derive value out of it.
22. Performance measurement issue: With no monitoring control or evaluation procedure, it is impossible to tell how the KM system is performing.
23. Legal issues: Laws and regulations may put constrains on inter-organizational knowledge sharing.
24. Failure to meet technological demand: Technology in place is inadequate (e.g. lack of functionality, architectural issues, system security) to support a network's actual knowledge transfer process.
25. Lack of user-friendly IS: The system is not adequately user friendly.
26. Data quality issues: Refers to availability, privacy, accessibility, accuracy, and completeness of shared data.
27. Data overload issues: There is more data available than that there is processing capacity available.
28. Data security issues: Technological issues generate reliability and security concerns in knowledge transfer.
29. Data integration issue: Different information systems are not capable of exchanging data.

6. Discussion

Although the importance of KTIs is recognized in literature, research is lacking on integrating the current findings into a single classification framework. The proposed framework in this paper enriches the current literature on KTIs in a network setting. It has been developed on the basis of well-structured processes and a solid methodological approach. Comparing our and current KTIs classification frameworks [6, 12, 13, 16-20], we could make the following observations.

Current frameworks rarely emphasize both tacit and explicit issues, while our framework considers both because from a knowledge type point of view, both tacit and explicit knowledge play a role in a value network. In our framework, the tacit issues are mainly covered by the relationship and the social issues categories, and the explicit issues are mainly covered by the technical issues category. However, a number of issues cannot be uniquely classified as being either tacit or explicit. This explains why the issues were merged into a single framework.

The main categories of current frameworks are usually defined from viewpoints on a more detailed level of abstraction –e.g. some of them are based on who or what is experiencing or causing the issue- while we focus on higher abstraction of issue types.

None of the other frameworks address issues that are of specific importance in value network settings (e.g. transactive memory, complex network issues). The analysis of issues on the one hand indicate that the reviewed literature has largely focused on studying and exploring semantic, data integration, lack of willingness, and trust issues. On the other hand, the shift from a stable network environment (e.g. supply chains) towards dynamic value networks results in emerging new issues. In the former a static and long-term collaboration can result in issues such as organizational aspect issues, whereas in the latter a dynamic collaboration of actors can result in issues such as contextualization issues.

Accordingly, by taking into account the literature on contemporary issues which result from dynamic collaboration, the proposed framework represents additional issues besides all issues mentioned by the other frameworks. These additional issues are transactive memory, complex network, authorization/data flow, data overload, and performance measurement issues. The combination of these additional and recurrently reported issues provide a basis for listing the important KTIs in a value network.

From a solution perspective, in a stable network setting, solutions aiming at resolving KTIs have received significant attention in literature. We found different solutions [19, 36, 40, 43]. For example to enhance trust, in [40] it is proposed to involve partners in a decision making process, to listen to their ideas, and to provide incentives for their knowledge sharing. In [19] it is suggested to use conversational knowledge sharing based on a community of practice and Web 2.0, to solve lack of motivation, organizational, and trust issues in knowledge transfer initiatives. However, such solutions have drawbacks such as they resolve a smaller set of issues and do not focus on the additional issues identified here. Thus, the effectiveness of such solutions in a value network setting is at least insufficient. Because of the difficulties resulting from dynamic partnerships, lack of centralized control, and distributed power across a network, KTIs cannot be handled easily.

Regarding practical application, our proposed classification framework provides a basis for developing guidelines that enable value networks to early identify and prioritize potential issues in relation to knowledge transfer. The early identification of issues can support them in developing solutions in order to overcome issues. A second application area is in supportive information systems development. There it can guide developers in extracting requirements from a well-defined basis, rather than from a chaotic ad hoc list of requirements.

7. Conclusion

Regarding the importance of knowledge sharing in a network setting, this paper identifies and classifies both tacit and explicit KTIs in a structured way (a systematic literature review and a structured classification process). By combining the rather ‘scattered’ literature on KTIs, this paper offers a more comprehensive view of issues that networks face in knowledge transfer. The proposed list of issues that are mostly validated by original authors in practice- present a well-founded theoretical basis to develop a checklist for identifying, and prioritizing potential issues. So it becomes easier for value networks to direct their focus to the areas that require more attention. The framework can also serve as a baseline for requirement engineering when developing information systems- as type of solution- through linking requirements to the original issues.

Addressing all important issues in a value network setting requires in-depth discussions with actors of a value network. Only then the significance of the issues can be addressed sufficiently. Further validation of the proposed KTIs’ classification framework in a value network setting has to be done in future research. Since KTIs can disrupt the performance of a value network, they must be profoundly recognized and proper solutions must be used in response. Therefore, different solution types also need to be investigated in future research.

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