

# Building a Framework for Actions and Roles in Organizational Knowledge Transfer

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**Abstract:** In order to analyze and improve knowledge management (KM) initiatives, organizations must be enabled to systematically look into the processes of organizational knowledge transfer. They need to know what roles are involved in these processes and what actions are performed. We propose that only if the building blocks of organizational knowledge transfer are known, reasonable in-detail analyses of KM initiatives can be conducted. In this paper we present a framework that structures roles and actions relevant in organizational knowledge transfer scenarios and that is useful for identifying and classifying factors which leverage or prevent knowledge transfer. The identification of roles and actions is inevitable since they build the core structure of knowledge transfer in an organization and therefore represent appropriate starting points for analyses. Without a proper framework that shows these starting points it might be difficult to set up a thought-out research that grasps the characteristics of organizational knowledge transfer. Furthermore, by contrasting IT supported knowledge transfer with non-electronic knowledge transfer our framework helps in answering the question how KM systems can support knowledge transfer.

**Keywords:** Knowledge management, Knowledge transfer, Knowledge management systems

## 1. Introduction

Knowledge management (KM) is seen as one of the most important tasks of organizations (von Krogh, 1998). But KM projects and knowledge management systems (KMS) often do not fulfill the needs of organizations. For example, a survey about management tool usage in international firms in 2001 showed that amongst all 25 considered management tools, KMS are at rank 19 in terms of usage frequency (Rigby, 2001). Concerning customer satisfaction, KMS have been evaluated with 3.22 on a scale from 1 (not satisfied) to 5 (very satisfied). That corresponds to rank 25 of all 25 considered types of management tools. Similarly, a Fraunhofer study from 2004 arrives at the conclusion that a general

dissatisfaction concerning KM exists: more than 75% of organizations from Germany, Austria, and Switzerland participating in the study were not comfortable with the current handling of knowledge, although KM projects had already been started (Decker et al., 2005).

In order to find out what leverages and prevents organizational KM, organizations need to have a tool that helps to set up a structured analysis, and researchers need a framework to find starting points for research. Both must be enabled to systematically look into the processes of organizational knowledge transfer, that is, they need to know what roles are involved in these processes and what actions are performed. Only if the building blocks of organizational knowledge transfer are known, efficient in-detail analyses of KM initiatives can be conducted. If KM in organizations includes information technology (IT) support, a comparison between knowledge transfer supported by KMS and non-electronic knowledge transfer is necessary in order to find out how IT can contribute to these processes. But a systematic comparison can only be conducted, if researchers and managers know what roles and actions in knowledge transfer are affected by IT support.

In this paper we present a framework that structures roles and actions relevant in organizational knowledge transfer scenarios and that can be used to identify the characteristics of knowledge transfer in concrete KM settings, enabling the organization to take specific actions to improve perceived problems. We see knowledge of roles and actions as inevitable for a reasonable analysis of KM projects, since they build the core structure of knowledge transfer in an organization and therefore represent appropriate starting points for research. Without a proper framework that shows these starting points it might be difficult to set up a thought-out measurement that grasps the characteristics of organizational knowledge transfer.

This paper does not describe how an actual analysis of problems or a research study concerning organizational KM should be conducted, but it provides a structuring and description of organizational knowledge transfer that might be useful for researchers and managers who plan to conduct analyses and research in a structured and efficient way. Our framework helps people to find out where to start looking for reasons of observed problems, but not how to actually conduct the research.

## **2. Related work**

We define *knowledge* as mental concepts that represent the nature of perceived objects and relationships between these objects. The basis of these mental concepts is, on the one hand, the result of cognitive processing that is triggered by the inflow of new stimuli (Alavi & Leidner, 2001). On the other hand, concepts

can be created or modified by applying common rules of conclusion to get insights based on these stimuli (Wittmann, 1979).

Following this view, knowledge has two fundamental attributes: first, since mental concepts belong to one person only, knowledge is always personal (Blair, 2002). It is bound to a person and is not an object that is concrete and easy to share, because it originates and is applied in the minds of people (Davenport & Prusak, 1998). According to (Miller, 2002) „knowledge is, after all, what we know. And what we know cannot be commodified.” Second, knowledge is not bound to the use of language, so that non-linguistic knowledge can exist (Bloch, 1991). This view is supported by the often cited statement that “we can know more than we can tell” (Polanyi, 1983).

Polanyi’s statement leads to the distinction of explicit and tacit knowledge: *explicit knowledge* can be expressed in words, drawings, equations, numbers, etc. and is therefore communicable to other persons (McBriar et al., 2003; Nonaka, 1994). To avoid confusion, we stress that explicit knowledge is different from articulated knowledge, since the former exists in people’s minds and the latter is perceivable representations of knowledge. In contrast to explicit knowledge, a person is not aware of his or her *tacit knowledge*. Due to a lack of awareness, articulation of tacit knowledge is only partly possible, and according to some researchers actually fully impossible (Collins, 1974; Herbig & Büssing, 2003).

*Knowledge transfer* can be seen as the transfer of mental concepts from one person to another embedded in an act of communication (Garavelli et al., 2002; Ko et al., 2005). For knowledge to be transferred to other persons, the knowledge carrier has to represent its mental concepts in a way that they are perceivable for other persons. We call the process of making knowledge “visible” to the outside world, so that it can be perceived by others, *knowledge articulation*. Since knowledge is what people have in their minds and data is external perceivable structures, knowledge transfer is not identical to data transfer. Or, as (Garavelli et al., 2002) put it: “Even when knowledge can be materialized in an object [...], the transfer of that object does not necessarily fulfill the knowledge transfer process.” That is because data has to be interpreted by people. Data is inherently meaningless, „it simply exists [...] – all waiting to be interpreted, all waiting to have meaning attached – by people.” (Miller, 2002). But one can never be sure that two persons associate the same representation with the same object.

If we use the term knowledge without further explanation, we always mean explicit knowledge that can be articulated and therefore be transferred between persons, after it was actually articulated. If we talk about knowledge transfer in the narrower sense, we refer to articulation of knowledge into any form of representations, transferring the representations and interpreting them in order to create new knowledge. We use the term knowledge transfer in a broader sense referring to knowledge transfer in the narrower sense including the processes of identifying, contacting and brokering knowledge sources, as well as the processes of storage and retrieval of knowledge.

In the literature several frameworks can be found that structure the domain of knowledge management from different points of views. We analyzed some of these frameworks with regard to their appropriateness for helping the researcher to identify characteristics of organizational knowledge transfer. Additionally, we evaluated if and how these frameworks place KMS in the domain of KM.

(Ahmed et al., 1999) propose a holistic model of KM which captures key elements and dimensions of KM and helps in screening and evaluating KM projects. It supports monitoring and tracking of KM initiatives, which is important for leveraging positive effects from managing knowledge. Since the model gives a very general view on KM projects as a whole and includes extra-organizational elements like customers and suppliers, its usefulness might be restricted for the analysis of organizational knowledge transfer in particular. It does not cover actions and roles related to knowledge transfer in detail, making it more difficult for managers and researchers to identify what leverages and prevents knowledge transfer processes. However, the framework does consider the role of technology in KM and gives starting points for analyzing how IT can effect and improve KM.

A more detailed model concerning the characteristics of organizational KM is proposed by (Shin, 2004). The author combines resource based perspective, transaction costs perspective and agency perspective in a holistic framework that helps organizations to identify positive and negative effects on KM and KMS. While this model covers lots of factors influencing KM, it does not examine all relevant roles and actions in organizational knowledge transfer. Its focus is still too wide, so that it might not be appropriate as a basis for identifying and analyzing the building blocks of organizational knowledge transfer.

A model of different types of knowledge creation, knowledge transformation, and knowledge transfer that is widespread in KM literature is the so called SECI model (Nonaka, 1994). It is based on the assumption that new knowledge emerges from transfer and transformation of explicit and tacit knowledge in all possible combinations between two persons: from tacit to explicit, from explicit to explicit, from explicit to tacit, and from tacit to tacit knowledge. But within the model, the definition of explicit knowledge is not precise, since it remains unclear if the author sees explicit knowledge as articulated knowledge that is independent of an individual, or as knowledge that could be articulated but still resides in a person's mind. Tacit knowledge is merely defined as knowledge that is "hard to formalize and communicate". Although the model describes some building blocks of organizational knowledge transfer, its imprecise definitions of different types of knowledge make it difficult for researchers and practitioners to implement the framework in empirical settings. Additionally, the model does not explicitly consider the role of IT in creating, transforming and transferring knowledge.

Since we did not find frameworks that adequately represent both the characteristics of knowledge transfer in organizations and the role of IT in knowledge transfer, we propose a new framework that structures and represents knowledge transfer situations.

### 3. Roles and actions in knowledge transfer

In order to efficiently analyze organizational knowledge transfer and to find out how KMS can support knowledge transfer, we will identify roles that participants of knowledge transfer processes might adopt and actions they might perform. Additionally, in order to give starting points for in-detail analyses we will describe some factors that leverage and prevent these actions. As a result, we present a framework of organizational knowledge transfer that combines the roles and actions in a graphical representation. The framework is an artifact in the context of design science according to the conceptual framework proposed by (Hevner et al., 2004). Its design is based on everyday observations and concepts that can be found in the KM literature and the integration of these ideas into a coherent framework.

#### 3.1. Roles in organizational knowledge transfer

The most obvious roles in a knowledge transfer process are *knowledge carrier* and *knowledge requestor*. The first role is adopted by persons that need knowledge about specific topics and the second role is adopted by persons that have knowledge about specific topics. Within an organization, people perform different tasks and are specialized in certain domains, so that each person holds different knowledge. Therefore, knowledge gaps between persons exist, which lead to the existence of knowledge carriers and knowledge requestors. Considering a specific topic X, knowledge carrier and knowledge requestor are different persons. That is, one person has knowledge about X, another person requires knowledge about X. Concerning different topics it is possible for a single person to be both a knowledge carrier for a specific topic X and a knowledge requestor for another topic Y. (Husted & Michailova, 2002) use the terms knowledge transmitters and knowledge receivers to refer to persons who have knowledge and to those who need knowledge. (Davenport & Prusak, 1998), who compare the processes of knowledge exchange with mechanisms known from markets for more tangible goods, introduce the terms knowledge seller and knowledge buyer, which we see as equivalent to knowledge carrier and knowledge requestor.

In order to preserve knowledge and make it accessible independently of a knowledge carrier, it must be articulated and stored in physical objects, which we call *knowledge repositories*. An IT system that can store and display articulated knowledge adopts the role of an electronic knowledge repository. These systems usually have mechanisms for acquisition, control, and publication of knowledge (Kankanhalli et al., 2005). Examples of electronic knowledge repositories are conventional document management systems (DMS), content management systems (CMS), or Wikis, storing and indexing electronic documents. If articulated knowledge is stored in non-electronic physical objects, we call these

objects manual knowledge repositories, e.g. books or printed documents in files. Both knowledge carriers and knowledge repositories are knowledge sources and could be considered equal concerning the role they adopt in organizational knowledge transfer. But, as we argue in the following section, actions involved with knowledge repositories are different from those involved with knowledge carriers, so that knowledge repositories are adopting an individual role.

Knowledge carriers, knowledge requestors, and knowledge repositories can be connected via knowledge brokers, which are persons or IT systems that bring together “those who need knowledge and those who have it” (Davenport & Prusak, 1998; Hellström et al., 2001). A person or an IT system acting as a knowledge broker does not have the knowledge that a knowledge requestor is asking for, but knows where to find that knowledge, i.e. the person or IT system has structural knowledge.

Similar to knowledge repositories, we differentiate between electronic and non-electronic knowledge brokers respectively: a person adopting the role of a non-electronic knowledge broker is, for example, a librarian, who works in the corporate library and knows where to find knowledge about a specific topic. Of course, everyone else who has structural knowledge about a topic of interest can act as a knowledge broker. Another example of a non-electronic knowledge broker is a card-index system that is used for finding archived files. An IT system storing information about where to find required knowledge serves as an electronic knowledge broker. Examples of electronic knowledge brokers are search engines that identify virtual locations of electronic documents, and electronic library catalogues allowing its users to find books about specific topics and indicating their physical locations within a library.

An IT system can combine both the roles of an electronic knowledge broker and electronic knowledge repository if it stores both articulated knowledge and structural knowledge. The same is true for non-electronic objects storing both articulated knowledge and structural knowledge. For example, a DMS that stores articulated knowledge in a database and therefore acts as an electronic knowledge repository, always comes with a search engine, allowing its users to find the virtual locations of required documents. It therefore combines both the role of an electronic knowledge repository and an electronic knowledge broker.

Concerning individuals, the very same person can adopt all of the aforementioned human roles, i.e. knowledge requestor, knowledge carrier and knowledge broker. Depending on topic and context, a person might act as a knowledge requestor concerning a topic X, as a knowledge carrier concerning a topic Y, and as a knowledge broker concerning a topic Z. From an omniscient point of view, the described roles can easily be assigned to a person or an object. But from an individual’s point of view, it might not be obvious what roles another person can adopt. Therefore, the identification of roles that a contacted person can adopt might be connected with additional costs.

The interaction between the described roles can be supported by *communication technology*, e.g. e-mail, telephone, and Instant Messaging. These

systems help people and machines to make their communication more efficient by reducing communication time, effort and costs. Since these systems neither store articulated knowledge nor structural knowledge, they are not any type of KMS, but support actions relevant in knowledge transfer processes.

### ***3.2. Actions in organizational knowledge transfer***

Having identified different roles that persons or objects can adopt in knowledge transfer processes, we will now describe actions that relate to these roles. In the text, each action is labeled with a number, which corresponds to a number in figure 1 in section 3.3. Additionally, we will give a short overview of factors that influence these actions in a positive and negative way. However, the list of factors is by no means complete, but provides a starting point for further research.

Probably the most common action in knowledge transfer scenarios is a knowledge request: a person needs knowledge about a specific topic and asks another person or an IT system about it (1). Knowledge requests can be sent from knowledge requestors to persons that are assumed to be knowledge carriers or knowledge brokers, to electronic knowledge brokers, and to electronic and non-electronic knowledge repositories.

As described in the previous section, in case of a personal knowledge request a knowledge requestor might not know for sure if a contacted person is a knowledge carrier, knowledge broker, or unknowing concerning the requested topic. That is, a knowledge requestor may spend time and effort trying to find out what role an asked person can adopt and trying to contact other persons if the previously asked persons could not help (Gray, 2000). Therefore, if knowledge requests in an organization are analyzed, one has to consider time and effort a knowledge requestor has to accept in order to find a person that can be of any help.

In order to estimate efforts of personal knowledge requests, further aspects have to be considered. For example, psychological barriers can exist that bar a knowledge requestor from asking another person for advice. The knowledge requestor might be afraid to steal someone's time or he or she might feel uncomfortable to reveal knowledge gaps. Furthermore, a knowledge requestor might hesitate asking a person because he or she is afraid that the knowledge carrier or knowledge broker expects favors in return for sharing his or her knowledge. Further aspects are related to the knowledge carrier: If a knowledge carrier is not perceived as reliable, trustworthy, or knowledgeable, initiating knowledge transfer will be more difficult as if there is evidence that the source is reputable (Szulanski, 2000). According to (Husted & Michailova, 2002), a main reason for knowledge-rejecting behavior is the "Not-Invented-Here" syndrome: knowledge requestors might generally doubt the validity and reliability of other persons' knowledge and therefore develop preferences for generating own ideas and knowledge. These psychological barriers might impede organizational knowledge transfer, even if a proper knowledge transfer infrastructure is available.

Knowledge requests to IT systems are different from those to humans insofar as knowledge requestors have to formulate their requests in a way that they are understandable for the systems. Since IT systems do not understand human language to such extent that the knowledge requestor can formulate a colloquial knowledge request, he or she must accept certain effort to formulate the request in a form that IT systems can understand.

According to section 2, *knowledge transfer* (2) in the narrower sense includes three processes: articulating knowledge into any forms of representations or data respectively (2a), transferring data (2b), and interpreting them (2c) in order to create new knowledge. If only one or two of these three processes are executed, we do not speak of knowledge transfer, but of knowledge articulation, data transfer, and data interpretation instead. Since efficient data transfer is beyond the scope of this paper, we focus on articulation of knowledge and interpretation of data in the following paragraphs.

Articulation of knowledge depends on several criteria regarding the assumed receivers and other environmental conditions. If knowledge can be articulated at all, depends on the type of knowledge. As described in section 2, we only consider explicit knowledge that still resides in a knowledge carrier's mind and can be articulated in principle.

If and how this knowledge is turned in articulated form depends on the knowledge carrier's capability of expression and encoding competence (Ko et al., 2005). Considering the time and effort that a knowledge carrier must spend for articulation, he or she might experience a lack of motivation, since the time necessary to articulate knowledge might be spent more profitable and more productive and can therefore be considered as opportunity costs (Kankanhalli et al., 2005). Another factor considering motivation is the fear of losing power and individual competitive advantages: if a knowledge carrier makes his or her knowledge publicly available, the person gets exchangeable concerning this particular knowledge (Gray, 2001; Husted & Michailova, 2002; Stenmark, 2001).

Representations usable for knowledge articulation are restricted by the availability and type of communication channels that transfer the representations. For example, if articulated knowledge is transferred by e-mail or Instant Messaging, only textual representations of knowledge can be used. If knowledge is stored in a knowledge repository, articulation is restricted by the representations the repository can deal with.

If articulated knowledge is comprehensible for other persons, depends on the knowledge carrier's and receiver's interpretations of the representations. Since persons all over the world speak different languages, whereas language not only refers to natural languages like English, German or Spanish, but also technical languages like "mechanical engineer" or "field sales" (Davenport & Prusak, 1998), they have different representations for articulating their knowledge and different ways of interpreting these representations. Similarly, (Ko et al., 2005) identified common understanding based on shared values, norms, philosophy, and



prior work to have a positive impact on the success of knowledge transfer. According to (Husted & Michailova, 2002), the fear of being misunderstood even prevents some knowledge carriers to share their knowledge.

In this context, it is relevant for the articulation process if the receiver is known and if he or she is assumed to have the same understanding of knowledge representations. If knowledge is articulated for storage in a knowledge repository, the future knowledge requestors might not be known, so that the representations of knowledge have to be unambiguous in order to avoid misunderstandings.

An electronic or non-electronic knowledge broker facilitates “contacts between knowledge need and such expertise” (Hellström et al., 2001), that is, the broker communicates structural knowledge. We call the process of transmitting structural knowledge *knowledge brokering* (3). Structural knowledge can point to knowledge carriers, knowledge repositories, or other knowledge brokers. In the last case, structural knowledge does not directly point to a knowledge source, but to another knowledge broker that might lead to the required knowledge.

Structural knowledge is transferred from knowledge brokers to knowledge requestors. This action can be conducted by both electronic and non-electronic knowledge brokers. Consider, for example, a situation where an employee asks the corporate librarian about where to find information about a specific topic. The librarian, adopting the role of a knowledge broker, conducts knowledge brokering by telling the knowledge requestor the name of a book containing the required knowledge.

Persons or machines that have been contacted as knowledge brokers can also forward a knowledge request to other knowledge brokers if they do not have the necessary structural knowledge to conduct knowledge brokering. They might even directly ask a knowledge carrier about the topic of interest or consult a knowledge repository. In these cases the acting person or IT system does not adopt the role of a knowledge broker any more, but that of a further knowledge requestor. After receiving the required knowledge, this requestor can either forward the received knowledge to the original knowledge requestor, adopting the role of a knowledge carrier, or conduct knowledge brokering by passing on contact information about the identified knowledge sources to the original knowledge requestor, facilitating direct contact between knowledge requestor and knowledge carrier.

For a knowledge broker to be successful, the available structural knowledge must be updated and extended frequently. Knowledge brokers known for little or expired structural knowledge will obviously only rarely be contacted by knowledge requestors. Therefore, knowledge brokers conduct *management of structural knowledge* in order to be up-to-date (4). Correspondingly, (Hellström et al., 2001) see the key tasks of knowledge brokers in identifying several knowledgeable persons and their respective competence areas, and in listing these persons.

For example, the well-known electronic knowledge broker “Google” frequently scans new web sites and re-visits already indexed web sites in order to extend and update its structural knowledge. Of course, knowledge brokers can interact with

knowledge carriers as well. Considering persons adopting the role of a knowledge broker, (Davenport & Prusak, 1998) describe some of the intra-organizational knowledge brokers as knowledge entrepreneurs, who “intentionally set out to become experts on who has knowledge and how to exploit it.” They invest time in moving around the organization, talking to people, listening, and establishing knowledge needs and corresponding expertise (Hellström et al., 2001).

A knowledge carrier may not have to wait for knowledge brokers to find him or her: the knowledge carrier can contribute actively to the actuality and scale of a knowledge broker by publishing his or her area of expertise and registering his or her contact details. For example, some social networking web sites allow organizations to register their contact details, line of business, and/or core competences for free. Having collected enough contacts, the web site can act as an electronic knowledge broker, so that knowledge requestors can use the site to find organizations that may have the required knowledge. Here, the knowledge carriers (the organizations) independently advertise their knowledge by contributing data to the electronic knowledge broker. We call the process of actively contributing structural knowledge to knowledge brokers *knowledge advertising* (5).

### ***3.3. Framework for organizational knowledge transfer***

In the previous sections we described four roles that persons or objects can adopt in knowledge transfer processes. In addition, we identified actions that can be conducted by the described roles. Figure 1 illustrates the relations between the described roles and actions in organizational knowledge transfer. The framework also shows the role of communication technology in knowledge transfer processes and delimits KMS from communication technology.

Since the mentioned roles and actions can be affected by external influences like incentive systems or the organizational knowledge sharing culture (Husted & Michailova, 2002), the framework additionally shows the environment of knowledge transfer processes.

Besides showing the building blocks of knowledge transfer, the framework provides a distinct terminology for the domain of KM, which is helpful for clearly addressing certain aspects in the domain.

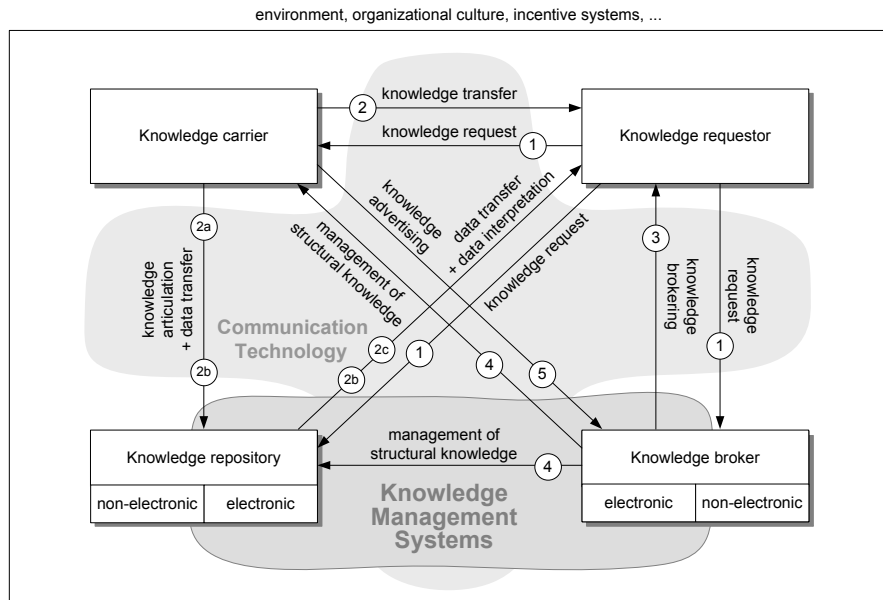


Figure 1: Framework for organizational knowledge transfer.

#### 4. Conclusion and outlook

Our framework shows roles and actions relevant in knowledge transfer situations. Based on these roles and actions, in-detail analyses concerning knowledge transfer can be conducted. For example, an organization could check if each of the described roles and actions exist within the organization and what costs, barriers, and benefits are involved with each of the described roles and actions, allowing more specific and goal-oriented improvements in organizational knowledge transfer. Furthermore, our framework clearly shows what roles can be adopted by IT systems and what actions can be influenced by IT, allowing structured analyses of knowledge transfer with and without IT support.

We see our framework as a single iteration in the search for an effective solution to the problem of understanding and analyzing knowledge transfer in organizations and enhance the impact of KM activities. Since we only considered a subset of relevant factors from the environment, the framework may be satisfactory for some situations, but not useful enough for more complex settings. Therefore, this paper is only one contribution to the process of designing a framework that can adequately map the relevant elements of organizational knowledge transfer.

Further research projects will have to show that the framework is useful for analyzing concrete knowledge transfer situations, for identifying factors that

leverage and prevent knowledge transfer processes, and for analyzing how IT systems impact these processes.

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