

# Knowledge Problems in Process-Oriented Organizations: A Pattern Approach

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**Abstract.** This contribution introduces a novel approach for the identification of knowledge problems in process-oriented organizations. On an operative level, knowledge problems occur when the generation, storage, transfer or application of knowledge is not in accordance with an organization's business goals. The concept of knowledge problem patterns represents a sound instrument to point organizations to such shortcomings and thereby opens up solution spaces for overcoming them. This contribution briefly introduces a set of knowledge problem patterns and an accompanying process of applying them in real world environments - both supported by empirical data generated in three conducted case studies. The concepts of this work provide new stimuli and insights for current research in the domain of business process oriented knowledge modelling and -audits.

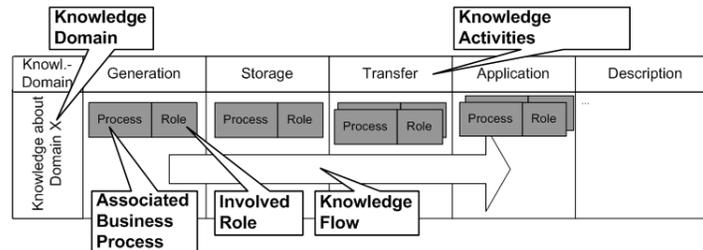
## 1 Motivation

Modern knowledge-based organizations increasingly face an urgent need to consciously deal with and effectively manage their most critical resource knowledge. On an operational level, many efforts focus on the management of knowledge activities in organizations such as the generation, storage, transfer or application of knowledge [1]. To ensure that KM initiatives focus on *relevant* areas of organizational knowledge work, often a process-oriented approach is pursued. By analyzing business processes from a knowledge perspective, *relevant* knowledge activities in organizations can be identified through e.g. the concept of knowledge processes. Here, knowledge processes are considered to visualize organizational knowledge work within and across distributed business processes [2]. Many factors are known that represent barriers for the execution of knowledge processes such as a lack of technological resources, transparency or trust [3]. Yet, these factors implicitly assume the suitability of existing knowledge processes and do not question the design or execution of them. Therefore, the contribution at hand introduces a set of very concrete knowledge problem patterns on an operative

level that 1) point organizations to wrongly defined or sub-optimally executed knowledge processes and 2) sketch up solution spaces in order to enable organizations “to do the right things” (vs. “to do things right”) when it comes to managing their most critical resource.

## 2 Approach

Knowledge problem patterns build on the existing concepts of knowledge processes [2, 4] and patterns [5]. *Knowledge processes* represent an approach of visualizing organizational knowledge flows based on business processes and thereby are considered to *represent the generation, storage, transfer and application of certain knowledge domains across or within business processes* [2] while *patterns* represent a *relation between a certain context, a problem, and a solution* [5]. Figure 1 depicts the main conceptual elements of knowledge processes while a concrete example is introduced in section 3. Today, organizational knowledge processes can be identified and visualized with available software tools (based on tool-supported interviews with employees [4]).



**Fig. 1.** Knowledge Processes Visualize Distributed Organizational Knowledge Work

Observations of reoccurring knowledge work patterns (e.g. [6]) and the supposition that patterns of certain knowledge process constellations are able to indicate relevant knowledge problems lead to the following definition of the term *knowledge problem pattern*:

*Knowledge problem patterns are generic constellations of knowledge processes that indicate knowledge problems and -deficits in organizations.*

Therefore, this contribution introduces a set of *knowledge problem patterns* (section 2.1) and an accompanying *process of applying them* (section 2.2) for the identification of potential knowledge problems in process-oriented organizations.

## 2.1 Knowledge Problem Patterns

Based on an analysis of empirical data generated from three conducted case studies<sup>3</sup>, a set of 9 knowledge problem patterns emerged, consisting of the following patterns: 1) Implicit Knowledge 2) Undefined Responsibility 3) Mythos 4) Knowledge Detour 5) Knowledge Outage 6) Long Term Indirect Communication / Loops 7) Chaos 8) Broadcasting and 9) Culmination with each pattern representing a certain knowledge process constellation. In order to illustrate the main principle behind these patterns, two of them are introduced in greater detail.

Knowl.-Domain	Generation	Storage	Transfer	Application	Description
Knowledge about Domain X	Process Role	?	Process Role	Process Role	...

**Fig. 2.** Knowledge Problem Pattern 1: Implicit Knowledge

*Pattern 1 "Implicit Knowledge"*, depicted in figure 2, refers to constellations of knowledge processes that do not include any kind of knowledge storage respectively explication, inferring that the only knowledge available in such situations is considered to be implicit. Organizations suffering from high employee turnover rates might increase the degree of explication concerning affected knowledge domains in order to overcome this knowledge problem.

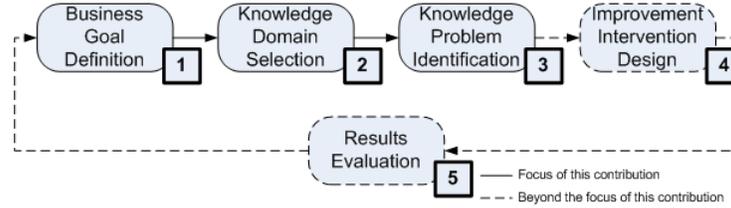
*Pattern 5 "Knowledge Outage"* refers to situations in which either the generation or the transfer of knowledge is not appropriately anchored within a business process. A critical business processes BP depending on knowledge domains where the generation and/or transfer of knowledge is not sufficiently managed may suffer from this unreliable "knowledge supply chain". Organizations aiming to tackle this problem might emphasize on the stronger integration of these knowledge activities in their respective business processes and thereby increase organizational knowledge support for business process BP.

Since all introduced knowledge problem patterns build on *formal* descriptions of knowledge processes (as introduced in [4]), they easily can be applied by performing automated analysis on top of knowledge processes identified in organizations<sup>4</sup>.

<sup>3</sup> These case studies were performed with partners from automotive, software and consulting industry. Each case study focussed on the identification of and support for knowledge processes based on [2]

<sup>4</sup> Here it is important to remark that although patterns in the sense of [5] include the elements 1. problem 2. context and 3. solution, the knowledge problem patterns at hand predominately focus on the elements *problems* and *context* and only sketch out *categories of solutions*.

## 2.2 Pattern-based Identification of Knowledge Problems



**Fig. 3.** The Process of Knowledge Problem Identification

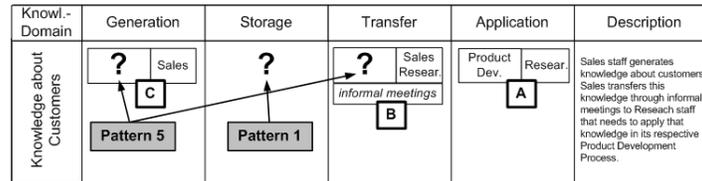
Knowledge problems *do not exist per se*. They represent current conditions that prevent organizations from effectively achieving their business goals. Therefore, in order to identify knowledge problems in organizations, first a set of business goals need to be recognized and/or defined (Step 1 - depicted in figure 3). Based on business goals, organizational knowledge domains and according identified knowledge processes can be selected (Step 2) that are considered to be of utmost importance for achieving these goals. Subsequently, knowledge problem patterns are applied to the selected knowledge processes to identify potential knowledge problems (Step 3). A detailed investigation of such identified knowledge problems leads to the design of improvement interventions (Step 4) that themselves need to be evaluated (Step 5) regarding their contribution to the addressed business goals (Step 1).

The next section introduces an application scenario in which this approach is applied to identify relevant knowledge problems in an organization.

## 3 Application Scenario

The improvement of customer satisfaction is among the top prioritized business goals of organization O. Acknowledging that knowledge about customers plays a key role in achieving higher customer satisfaction, the organization follows a knowledge-oriented approach to tackle this challenge. Figure 1 depicts the knowledge process "Knowledge about Customers" that was identified and considered to be important by organization O. In this knowledge process, researchers (Resear.) of organization O need to apply knowledge about customers in their respective product development (Product Dev.) business process (see 'A' in figure 1). They receive that kind of knowledge through informal meetings (see 'B') with sales agents (see 'C') that generate that knowledge through customer interaction.

After applying knowledge problem patterns to the knowledge process constellation of figure 4, the following can be concluded for organization O: 1. No knowledge is being explicated in that knowledge process (Pattern 1 "Implicit



**Fig. 4.** Pattern-based Knowledge Problem Identification

Knowledge” in figure 4) and 2. The generation as well as the transfer of knowledge about customers is not covered respectively organizationally supported in any business process (Pattern 5 ”Knowledge Outage” in figure 4). Findings like these might pose severe problems for organization O’s goal to improve satisfaction among its customers. Based on these insights, the organization might focus on increased explication of knowledge (e.g. introduction of meeting minutes) or on the detailed modelling and implementation of sales processes that take knowledge aspects into account to overcome the identified knowledge problems and thereby meet their respective business goals. In doing that, organizations are enabled to implement *necessary* knowledge management interventions that *visibly contribute* to organizational success.

## 4 Conclusions

Knowledge problem patterns point organizations to conditions that prevent them from effectively achieving their business goals. In this contribution, a set of knowledge problem patterns and an according process of applying them was introduced. Thereby it is important to keep in mind that the introduced knowledge problem patterns represent *indicators* for *potential knowledge problems* and no bullet-proof triggers for improvement actions. Nevertheless, by identifying potential knowledge problems in organizations, knowledge problem patterns do significantly accelerate analysis efforts and focus the design of improvement interventions in *critical* business areas from a knowledge perspective. Thereby, organizations are enabled to exploit previously unknown improvement potentials for successfully meeting their respective business challenges.

## Acknowledgments

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