Eliciting Employee & Customer Knowledge for Process Development and Optimization – An Industry Case

David Braunstein, Gabriela Pesch

DeepFinding SE
`david.braunstein@deepfinding.com`
`gabriela.pesch@deepfinding.com`

Abstract. Practical experiences from the field indicate that the development of organizations is driven by implementing standardized process models. Although these are well understood by IT experts and consultants, stakeholder knowledge and needs are very likely disregarded in such approaches. However, there exist methods and techniques allowing to elicit relevant implicit stakeholder knowledge and transform it to process models, in order to get a grip on essential assets of an organization. In the presented case study we demonstrate how to overcome the aforementioned limitations in traditional development settings by involving those in process design that are either actually performing tasks or involved in their processing, namely employees and customers. The applied technique aims to tackle 'blind spots' of business operation, and collaboration of stakeholder. Consequently, those who have to carry out operational processes become informed to overview business operation and understand overarching procedures (again). Besides bridging the gap between technical process design and informal knowing, organizational learning towards collective resilient behavior can be triggered through continuous process development. Utilizing computer-support for knowledge and business process management methods, agile process design takes into account both, customer needs and experiential knowledge of employees. Key is to network process-relevant knowledge across departments and organizations.

Keywords: knowledge-driven BPM, implicit knowledge, knowledge elicitation, mental models

1 Introduction

In many fields stakeholder knowledge is considered key to build up capacity or achieve informed decision making (cf. [5] for recent findings). With respect to business process development for the elicitation of knowledge, i.e. helping to make explicit the knowledge concepts and reasoning requirements for successful business operation, the involvement of stakeholders is considered essential [4]. Thereby, knowledge is elicited to capture, store and deploy knowledge using IT to facilitate business processes in the organization (cf. [9]). Elicitation of knowledge is central to Knowledge Management aiming at creating, codifying and sharing valuable knowledge to the organization

[8]. Acquiring, organizing, and communicating both implicit and explicit knowledge of employees so, that other employees may make use of it to be more effective and productive in their work, includes capturing implicit knowledge. It is considered as individual knowledge and needs to be converted to explicit knowledge, in order to improve business operation. Hence, the most beneficiary from knowledge elicitation is business process development and its implementation, e.g., through workflow management systems (cf. [1]).

This paper focuses on the incorporation of knowledge management into process development and optimization by proposing a technique to enhance the process of eliciting implicit work knowledge in the field of process engineering. We propose incorporating knowledge elicitation into business process management for the purpose of externalizing implicit knowledge. The technique enables converting implicit to explicit knowledge, allowing in a particular stage of organizational development to work with implicit knowledge when it becomes explicit. It then can embodied in process representations.

In this paper we present a corresponding case study. In section 2 we provide some conceptual background on eliciting and externalization stakeholder knowledge for operational use. In section 3 we introduce the case from industry and detail the starting point and case objectives, namely, recognizing the time-criticality of tendering when compared to competitors on the market. In section 4, we briefly introduce our frame of operation. Although its focus is on knowledge elicitation, it targets grounding process designs on externalized stakeholder knowledge in a transparent and traceable way. In section 5, we introduce the structured procedure to externalize implicit stakeholder knowledge and propagate it to organizational structures for further processing. Section 6 concludes the paper.

2   Externalization of Stakeholder Knowledge

Nonaka et al.'s knowledge management model [8] embodies the conversion of implicit knowledge as part of organizational change, whereby Von Krogh et al. [7] have explored context and operational factors of generating knowledge for organizations. Of particular importance is the involvement of stakeholders for externalizing organization-relevant knowledge. This activity is part of several spiral stages of exploring the potential of change in an organization. The development process encompasses four modes, termed as Socialization, Externalization, Combination, and Internalization (SECI). Along socialization, implicit knowledge is exchanged between individuals mainly by observation and imitation. Thereby, sharing experience, collaboration team, and direct interaction are of crucial importance, while the externalization mode is more like a dialogue and finally, a collective reflection on work experience. It involves encoding implicit knowledge in documents, data structures, or formal procedures.

One purpose of externalization is to articulate self-knowledge in terms of images, ideas, and words. Another purpose is to elicit and transform implicit knowledge to understandable forms (explicit knowledge). Therefore, dialogue is a very important means for both. Continuously, the combination mode reconfigures objects of explicit

knowledge through sorting, adding, and combining codified elements. This mode concerns the transformation of explicit to explicit knowledge. Finally, in the internalization mode stakeholders internalize explicit knowledge adapting their mental models by understanding and absorbing explicit knowledge to implicit knowledge. Individuals achieve that largely by experience.

Implicit knowledge is considered as "hidden known" and difficult to articulate as it resides in human' brains. Consequently, organizational management as well as work force and other stakeholders (customers, business partners etc.) need an effective method in order to elicit relevant knowledge in a traceable and communicative way [3].

3   The Industry Case: Time-Critical Bidding

In our case study we refer to the offering process of an industrial company producing large heating systems. Specifically, it concerns the maintenance and modernization of existing plants. The trigger of organizational transformation have been critical inputs by customers referring to the offering process. Customers have criticized the lengthy bidding process – the addressed company (in the following we label the company A) needs up to 12 weeks to come up with a tender, whereas its competitors place bids within four weeks. In addition, management and employees of A have raised concerns referring to the high demands on automation:

- *Disruptive processes*: IT and process consultants have created multi-part process chains. They have developed process specifications for experts by experts. Employees could not identify themselves with the process definition because their know-how had not been recognized and included.
- *Lack of agile processes*: Employees perceived weaknesses in the bidding process. However, they did not communicate their findings because they did not feel they could contribute to shaping and further developing the bidding process.
- *Focus on IT-intensive process design*: Company A had invested a lot of money and effort in technology and applications in recent years. Although one of the objectives has been to reduce the lead times of quoting and response times to customers, the system developers focused on the data volume (BigData) rather than on the quality of the data (DeepData). Once the data volume became the basis of each offering case, they were core drivers of the throughput of the system. As a consequence, the company could not reduce response times without further effort.
- *Lack of participatory development*: People were not involved in the development of process designs. Their knowledge had not been considered or had got lost. Moreover, the design of the offering process ignored interfaces relevant for coordination and task completion.
- *Lack of requirements engineering:* Finally, the requirements of departments had not been acquired and thus remained unknown. Since there had not been a structured and adjusted collection of requirements, the bidding process had not been considered as a whole so far. Therefore, the necessity and meaningfulness of coordination with others had not become a development issue so far.

As this list of triggers for improving this business case reveals, several stakeholders are involved in the bidding process. However, they neither have participated in a collaborative development process so far, nor has their knowledge been acquired in a way they themselves or their managers have been able to improve the organizational performance. It would require aligned and mutually acknowledged process designs.

4   Operational Frame

In this section, we briefly introduce our framework we utilize when working with our customers. We share with them the following question for developing their organization of work:

- '*How can organizational work processes be continuously developed and optimized when recognizing the internal employee perspective on coordination while aligning it with the (external) customer view and needs?*'

To our experience, this question has turned out of particular importance, once organizational development or transformation projects have been driven by IT departments and/or consultants not familiar with the organizational situation at hand.

In order to use the experiential knowledge of customers and employees for process development, a development technique should be able to uncover implicit knowledge, since it strongly influences activities stakeholders perform along business processes. Our approach aims to detect knowledge about process chains without pre-defined technical questions or specifying particular content topics. We rather develop relevant content by asking the participants to define scenarios by themselves including idealized processes. These are scenarios they themselves are not aware of in the beginning of a transformation project, as they use their implicit knowledge intuitively. As such, it is not a self-evident part of conscious experience.

In order to know how processes can be developed and improved in a sustainable way, we need to generate a comprehensive picture of the development situation. Even when complex requirements are given, a structured representation of relevant items is required to handle them in an organized way. It is the structured representation where solutions can be located. Since customers and employees are relevant sources of both information and innovation, we always incorporate the market and organizational view of processes into the development and optimization process. We frame each case according to the nested structure shown in Fig. 1.
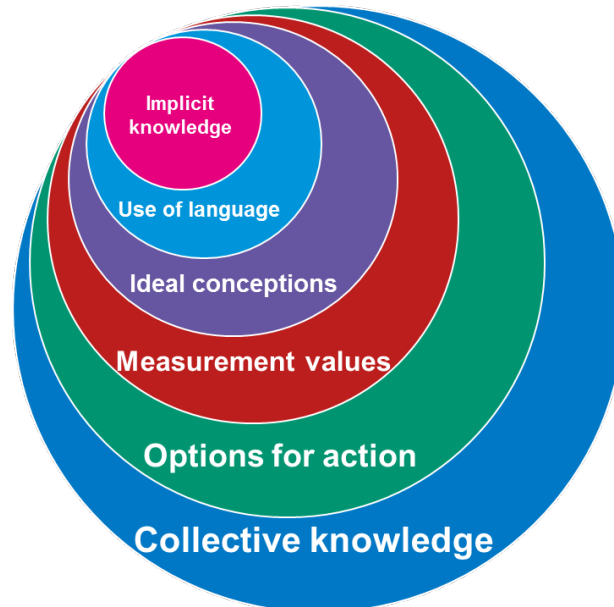
Fig. 1. Operational frame: Implicit knowledge propagating to collective knowledge

The frame of operation represents a continuum of knowledge states:

- **Implicit knowledge** forms the basis for perceptions and decisions. It essentially shapes corporate culture and corporate success. Employees tend to use their experience in work processes in increasingly automated and thus barely reflective ways. Although implicit knowledge is guiding people's actions, at the same time, it is mostly unconscious and used intuitively. People only have minimal immediate access to it. We aim making this knowledge accessible for organizations.
- **Use of language.** Language is *per se* ambiguous. Meaning conveyed by language comes into being once humans pass on verbal statements. For instance, only by having a common understanding of the entire bidding process, employees are able to communicate with other departments and develop the process further. We need to utilize certain mechanisms to bring the language code to the surface according to the specific corporate culture where it is used. Then, cultural factors or aspects become visible and can be shared for further processing.
- **Ideal conceptions and future expectations** trigger changing perspectives of the stakeholder (groups) involved. In many cases, causal thinking needs to get interrupted, to allow for innovative ideas to emerge from currently perceiving the organization and its environment. We target changing perspectives in a structured while open process. It aims capturing both, working, and envisioned scenarios as perceived by interviewed stakeholders.
- **Measurement and rating:** Mostly, organizations work with KPIs referring to the past rather than providing a picture of the current situation or envisioning transfor-

mation. Why not allow involved stakeholder groups to rate statements from interviews completely by themselves? Future expectations and ideal conceptions can then be integrated in the rating. Thus, the individual relevance of topics becomes transparent and concrete to be shared.

- **Options for action** need to be developed and formulated by those (groups of) stakeholders that are actually involved in a business case. They should not be generated from sources external to the organization, in particular when aiming to achieve collective acceptance for a business process. They should rather stem from concerned stakeholders interested in active management of change and envisioning future scenarios and work processes.
- **Collective knowledge:** The frame of operation allows grasping the collective memory of an organization and its environment. It consists of qualitative and quantitative information, implicit knowledge, use of language, ideal conceptions, options for action, and finally, degrees of fulfillment which can be calculated on the basis of the ratings. The resulting findings ensures organizations to decide upon transformation adequate to the situation of an organization at hand, as the elicited data stem from their stakeholders, and thus correspond to the opportunities they consider relevant for the organization's development.

The continuum, when described as nested structure, shows as core concept of the approach implicit knowledge. Like using an inverse cone, it allows bootstrapping information, communicating, and finally sharing potentials of change.

5   Procedure

In this section, we introduce the structured procedure we follow when eliciting implicit knowledge and successively processing and enriching it. It enables generating business processes specifications considered valid for the involved stakeholders. These specifications correspond to the current organizational capability revealed by the elicitation procedure and subsequent calculations.

In order to demonstrate the approach, we use the industrial case as introduced in section 3. The customer, company A, is an industrial manufacturer of complex heating systems. They are used in large and major buildings. At the manufacturer plants' 80% of the parts are self-produced and 20% of those are purchased. Customers of A are companies that operate large warehouses, industrial plants, office buildings, or hospitals. Company A has specialized in supporting the operation of newly constructed plants as well as modernized ones. Our case concerns bids ranging from preparing maintenance to modernizing existing plants. Although for most of the tasks the company employs technicians, it also employ many non-technicians in the field. In order to optimize sales and to enhance the retrogressive sales figures, the sales process of the company needed to be evaluated first and foremost from an internal (employee) and external (customer) point of view.

In order to develop a complete (knowledge) picture of the situation, each of our projects follows several sequential stages:

1. Goal setting workshop
2. Case design
3. Knowledge externalization
4. Group analysis
5. Presentation of results
6. Prioritization and transfer workshop
7. Evaluation

We describe each of them in detail in the following.

5.1   Goal setting workshop

The starting point of the technique is a workshop in which solution-focused, systemic questions are used to scope the development project and detail the project objectives in terms of work tasks with the company. In our case, company A wanted to better service their customers with existing heating systems because they had already lost many customers to competitors in this segment due to the lack of service quality. In order to scrutinize the task from an internal point of view, all involved stakeholders clarify what is going well in bidding processes and should therefore be maintained in the future, and what should be improved. Since systemic questions can also trigger a change of perspective, the workshop participants are motivated to develop conceptions about ideal work processes.

The result of the workshop is a formulation of a common project goal of the company's project team, in our case company's A project team:

- Longer life for existing facilities for our customers

According to the workshop participants, this goal needs to be considered in relation to

- Optimization of the bidding process
- Increase of quality of service
- Efficiency in modernization
- Innovation
- Digital services

The results of the workshop provide the input for the next step.

5.2   Case design

Based on the goal setting workshop, the design for further examination is individually tailored to the topic. Conventional information retrieval tools, such as interview questionnaires or interview guides, use questions to deepen the topic. We have discovered that questions directly referring to work content and organizational structures are not appropriate to get in-depth information about work processes in companies. Questions or analysis guides are always based on (implicit) hypotheses, and thus predisposition the frame in which respondents have to answer and develop ideas for improvement.

Thereby, it restricts the set of options for answering, and is likely to exclude all other subject matters in the context of each item.

In contrast to existing questionnaires or interview techniques, we map the object of investigation to so-called carriers of meaning. They constitute anchors or points of reference for eliciting work knowledge. They form some structural language because they merely represent a framework without predetermining or specifying any problem- or solution-relevant content. In our case study, the following carriers of meaning could be identified for further eliciting knowledge about work processes:

- "Work process currently" anchors how a work process is currently perceived by employees
- "Work process in three years" highlights the expectations of employees when optimizing the work process in three years
- "Ideal work process" forms the baseline how the employees would describe the process from an ideal perspective
- "Innovation in the enterprise today" anchors how innovation is perceived today in the organization
- "Innovation in the enterprise ideal" refers to how the organization ideally should innovate
- "Digitization in the organization today" means how digitization is currently perceived in the organization
- "Digitization in the organization ideally" means how digitization should occur in an ideal case in the organization

After successfully testing the design of the case at hand with stakeholders, appointments are arranged with a selected group of people that will be interviewed (see section on knowledge externalization). They stem from different stakeholder groups and are employees, leaders, management, or customers.

5.3   Knowledge externalization

The interlocutors (executives, employees, or customers of company A) now all go through the same inquiry process several times. This cycle of drawing distinctions to evaluation is repeated in an interview between 6-8 times until all aspects relevant to the interlocutor are expressed about the topic. The special process prevents from an intentionally rational distortion when eliciting their knowledge. In this way, respondents should be enabled to rely exclusively on their intuition, even given a large number of individual decisions (selecting a carrier of meaning out of three choices, and rating on a scale). Each cycle of the procedure follows a specific sequence of steps:

- Draw distinctions by identifying specific properties of a carrier of meaning
- Formulate construct, i.e. labeling a property
- Clarify language usage, i.e. ascertain meaning to a statement
- Develop ideal conception
- Formulate options for action
- Assessment of relevance

We detail the line of activities in the following.

3.3.1 Draw distinctions

In our technique, people's ability to draw distinctions is at the center of information gathering. It relies on the recognized and scientifically applied technique of George A. Kelly [6] and has been extended by a methodological frame, in particular for structuring the results and in this way, creating insight for context-sensitive organizational development. Due to its nature, the elicitation procedure overcomes pre-determined options of answering. It rather offers subjective freedom, a direct access to language, and gives space for articulating implicit knowledge. It enables other persons to access individual and previously not uttered experiences by means of common communication, i.e. natural language. The approach originates from the repertory-grid method that is highly accepted by interlocutors (see [14]). It is an effective method to collect implicit knowledge, and widely used in knowledge management projects (see [11]).

Drawing distinctions triggers a deep reflection process making implicit knowledge accessible for organizations. We use a software system supporting the elicitation cycles. The software randomly selects three elements from a set of 10-15 carriers of meaning. The interlocutor draws a distinction identifying a certain difference. A triad may read as follows:

- There are the following three carriers of meaning:
  - "Work process currently"
  - "Work process in 3 years"
  - "Innovation in the company today"

The task of the respondent is now to make a distinction, instructing the respondent as follows:

- Which two of these three carriers of meaning are similar and thus, different from the third, in relation to the work processes in your company?

The interlocutor now intuitively makes a complex decision. For instance, "Work process currently" and "Work process in 3 years" are similar for the respondent.

3.3.2 Formulate a construct

The interlocutor now describes the commonality of the two carriers of meaning in the form of a property term or a short sentence. For instance, the commonality he identifies is "complicated". The term is documented for further rating.

Since people think and decide in opposites, e.g., 'high' versus 'low', the opposite of the term is elicited from the participant in the course of the interview:

- What do you consider the opposite of "complicated" in terms of the work processes in your company?

In our sample case the answer is "structured". Hence, for the construct "complicated" the individual opposite is "structured". It is termed contrast and documented, too.

This contrast does not have to be the semantic opposite as generally acknowledged, it rather expresses how the interlocutor describes the opposite according to his/her individual mindset. We guide the interlocutor to change perspective. Thereby, not only the semantic opposite of the term is of interest, but actually taking a position in which a completely different state than the one described with "complicated" is experienced. The interlocutor needs to feel the opposite before expressing it in verbal terms.

We also use systemic gestures in that context. They enable the interlocutor to articulate new and previously unutterable knowledge. Accordingly, knowledge is externalized in a transverbal language. It supplements purely verbal language as it points out content which could not have been talked about in verbal language before the natural language utterance.

3.3.3   Clarify language usage and meaning

Since language utterances can be ambiguous, we need to clarify concepts until the meaning has been clarified and becomes understandable. Then, the addressed concepts and their use can be described in terms of observable actions. In this way, we are able to feed back to an organization how language is actually used within the organization, and when having contact to external partners and customers. Another effect of this kind of elicitation is that a common language can be developed for the organization. For instance, we could clarify what the construct "complicated" versus the contrast "structured" actually means for the involved stakeholders in terms of work processes. Sample explanations were:

- "By "**complex**" I mean the complexity of our quotation process - it is too restrictive. We cannot talk to our internal technicians because our ticket system does not allow this. Only when the topic is resolved can we trigger a ticket. Otherwise, the meeting goes on our cost center, but in order to speak I must first clarify with the technology what it's all about because then I can formulate a request to the technology department."
- ""**Structured** "means we have a clearer process in the quoting process. We know, as soon as the customer has made a request, that we can join forces with the technology department without having to take account internal cost centers. We thus clarify the topic in the interests of the customer, saving a lot of time due to the iterations that we now have to go through in the process. As a result, the reaction time for the customer is much shorter."

We ask each stakeholder to explain each construct and contrast, in order to reveal commonalities and differences with respect to the use and meaning of qualifying terms. They influence work processes of organization in many cases.

3.3.4   Formulate ideal conceptions and develop transversal competencies

Transversal skills or transferable skills are all those skills that have been acquired in a specific context or when managing a specific situation, and can be transferred to other situations and/or to a different context [12] - see also the KeySTART2Work Project on transversal competences which is funded by the European Commission [2]. We work

with systemic coaching interventions to identify them. They facilitate developing ide-alized processes with interlocutors according to their personal view.

When describing what an ideal process looks like, interlocutors also clarify their own contribution to a specific work process. Thereby, one becomes aware of one´s own contribution and the ability to make this contribution. Both can be articulated in the course of the intervention process. For instance, the ideal work process could look like that:

- "I work in a network with other departments, we have all the customer requirements in mind and we are committed to bringing the offer to the customer quickly (in two weeks). My personal contribution is that I enter into the CRM system any data about existing heating systems that already are available in the house, or I appoint someone to do so. This speeds up the process enormously because the local sales department immediately has all the data about the existing heating system available."

Hence, the ideal conception of work tasks allow establishing points of reference when evaluating current situations. They allow the interlocutors and others expressing an op-timal case or properties they would like to achieve with respect to social constellations, work procedures, as well as products and their development.

3.3.5 Develop options for action

Based on the existing process of creating offers, the respondents develop options for action. In our sample case, they were adjusted along a three-partite time line: currently, in 3 years, and ideally:

- **"Work process currently"**: an obstacle is the ticket system - technology hinders to preliminary talk about the bidding
- **"Work process in 3 years"**: Cost savings have been achieved without tickets, because the offer goes much earlier and without feedback to the customer. Questions can be clarified quickly.
- **"Ideal work process"**: teams from sales and technology are networked, data from existing systems are in the CRM system to support local sales. Offer lead time is two weeks.

Structuring the timeline facilitates to design specific interventions that could fit to an organization's status. For instance, adapting existing support technology might be a matter of months, whereas changing the willingness to cooperate might require several elicitation steps before re-designing and implementing modifications.

3.3.6 Assessment of relevance

Within the term dimensions (constructs and contrasts) as developed by the respond-ents, e.g., "complicated" versus "structured", a specific scale is applied for rating. We use a 6-part scale. Then, each carrier of meaning is rated according to the scale, again, featuring intuitively judgements by the interlocutor within these terms. The scale does not show real numbers, as it is not about giving grades, but are rather markers, as the carriers of meaning should be intuitively ranked with regard to proximity or distance to

one of the terms. This assessment reveals the relevance of topics and is part of preparing the data for a mathematical, statistical analysis.
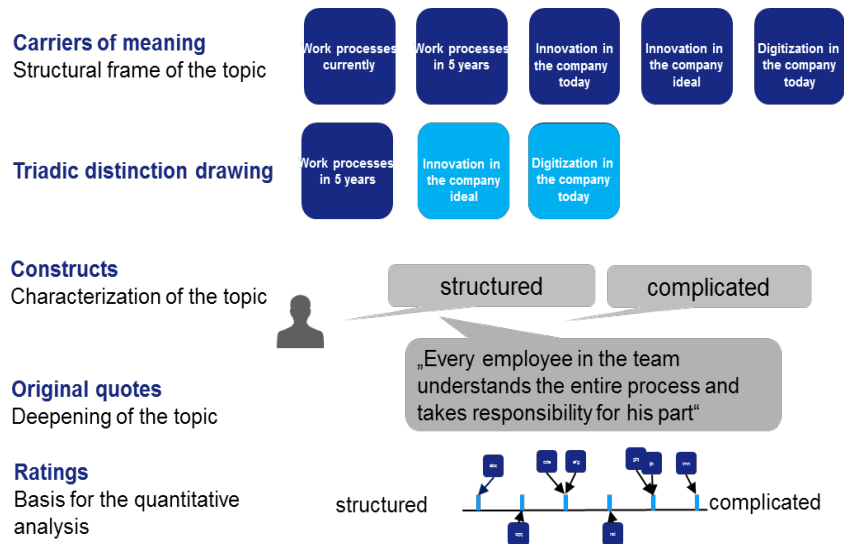

Fig. 2. Structure and procedural scheme of a case

Fig. 2 shows the structure of the elicitation scheme and procedure followed so far. Each statement of interlocutors is bound to a carrier of meaning. Hence, the initial step is crucial for creating meaningful results. Carriers of meaning need to represent items that both,

- interlocutors are familiar with, and
- have a close semantic distance to the topic to be addressed in the course of acquiring knowledge.

The triadic selection scheme facilitates binding of distinctive properties that are characteristic of the carriers of meaning and allow for further elaboration. The latter is of eminent importance

- not only to understand the existing perception of a situation or a process,
- but rather to describe an ideal situation or process in terms of clarified labels and elaborated ratings.

Therefore, we also collect all original statements provided by interviewees. They enable identification of meanings and allow tracing back the elicitation process to the individual context of the structured raw data.

5.4 Group analysis

At a first glance, the technique seems to be based on a qualitative approach. However, we have developed specific procedures and algorithms. They allow several hundred individual interviews to be combined mathematically and statistically into a group analysis. The analysis can be both qualitative and quantitative, including statistical multivariate methods, multidimensional scaling, principal component analysis, and a specific algorithm.

The construct or component space can be used to identify the terms (constructs) relevant to a topic (carriers of meaning) (association measures). The meaning of the elicited terms is clarified and deepened by the qualitative information (original statements), and annotated to the terms (qualitative evaluation). In addition, the distances between carriers of meaning and constructs are determined in the construct or component space according to [13]. These distances can be used to quantitatively describe the similarity or dissimilarity of a meaning carrier X currently has compared to a meaning carrier X in an ideal case, e.g., through degrees of fulfillment.

In terms of reliability and validity, there are various sources of evidence: With regard to the patterns of meaning carriers, e.g., Sperlinger [10] demonstrated a retest reliability of 0.95. Previous empirical research proves the outstanding effectiveness of the basic principle of Kelly [6]. Relevant deviations from the results or serious contradictions to parallel comparative measurements with standardized questionnaires and other methods have not yet been determined.
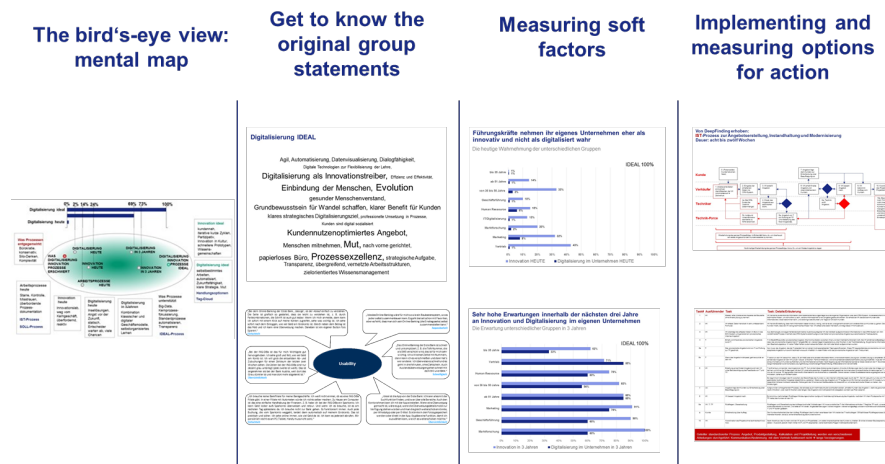

Fig. 3. Sample presentation of results

Figure 3 shows a sample presentation of results. It is composed of an animated concept map conveying a bird's-eye-view on the elicited constructs and contrasts. In addition to the items, original statements are presented indicating the frequency of terms and statements. Besides overviewing, the measurement of acquired soft factors, the elicited

options for action are detailed as process specifications through role-specific task flow diagrams (right side of the figure).

5.5 Results

We present the results in form of various charts and evaluation methods. They are a way to visualize the differences in the processes TODAY, OUGHT-TO-BE, and IDEAL. Here are some key findings of the case, encoding the PROCESSES TODAY in the way the interlocutors have described them along the elicitation.

They could identify four most dominant problems:

1) The sales department has little know-how how to collect the data needed for the working processes on the construction.
2) Lack of technical equipment for putting in the data on their occurrence into the IT-system.
3) No freely available data sources that could be used, although they exist in the company.
4) Queries cannot be repeated when running the offering process. That is the reason why many iterations of process steps occur, involving sales and the technology department, which finally lead to a time loss.

We let the customers draw a picture of their IDEAL offering process. The customers described an ideal offering process especially with fast feedback on a request or inquiry offer period. It needs to be limited to four weeks. They captured the ideal offering process as follows:

1. On-going communication on technical issues must take place without waiting times - there are enormous costs and problems when the system has to be shut down.
2. Silo thinking in terms of departments should give way to networked thinking.
3. Agile development and ongoing optimization of processes strengthen personal responsibility of executive employees.
4. Optimize work processes based on customer requirements.
5. Covering all plants in the Customer Relationship Management (CRM) system, so that sales can get access and use the data.
6. Technical equipment for the complimenting elicitation of data, i.e. a helmet with Google-glasses. In this way, the technology department should provide sales support on-site.
7. Tablets for connecting to the company's server, in order to complete missing data directly at the customer's location.
8. Networking the company's sales and technology departments from the start to create a personal exchange between the co-workers.
9. A common development of the offer including sales and technology for answering customer questions on the spot. Technology is provided so that co-workers can connect via teleconference.
10. After delivering the offer acceptance, sales department should inform the project leader once every month.

After completion of the order by the customer, sales continues to be responsible for the project and is in charge of the communication between customer, technology, and other departments. In doing so, however, sales is referred to as project management instead of sales. Since sales people are not technologically skilled, the project manager can invite the technology department to the quarterly meetings that take place on the construction site. Since such commitments can be time-consuming, the project manager may connect the technology department via teleconferencing to the meeting on the construction site.

The IT-department teamed up with the internal quality management to create the OUGHT-TO-BE process regarding the development of an offer. The results have been presented in different charts and evaluation sheets. When focusing on the case, the offer preparation process has been detailed. Fig. 4 puts the target, current, and envisioned IDEAL process specification into mutual context.
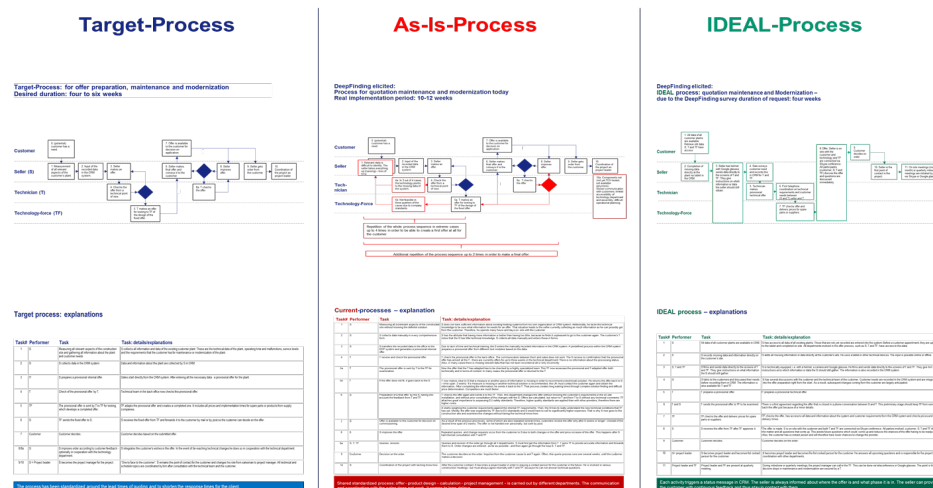

Fig. 4. Sample results encoded in process specifications

Once this step has been reached a roll-out for the organization can be planned, however taking into account the organization's structural, human resource, and technical capabilities.

5.6   Prioritization and transfer workshop

One week to a maximum of one month after the presentation of the results, the options for action are worked on in a workshop together with the company's team. In the workshop the company completes the list of options for action before rating them. The result is a four-field matrix, which sheds light on the question which topics should be implemented urgently, and less urgently, from an internal point of view. In our case study, concrete solutions were found to improve the offer generation process, which could also be implemented in a straightforward way.
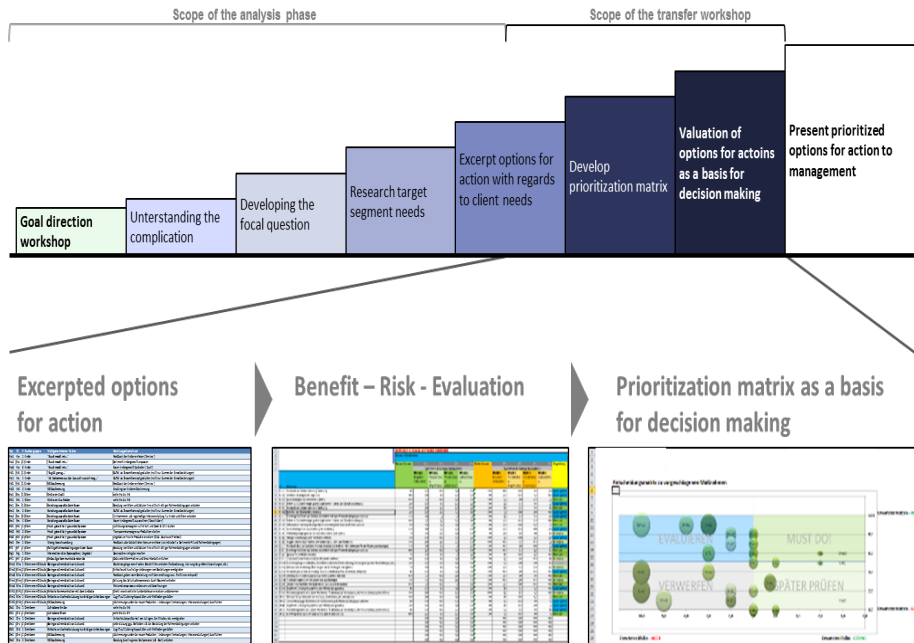
Fig. 5. Snapshots from a transfer workshop

Fig. 5 exemplifies data from running the transfer workshop. There may be several perspectives on the elicited knowledge that are of interest for different organizational units or projects.

5.7   Evaluation of change

Agile process development means the continuous coordination of the knowledge of all stakeholders being involved in a process. Both, the customer view, and the internal view provide information about optimization opportunities. This information about processes form the basis for the development of a big 'knowledge' picture, as it refers to multiple points in time, i.e. intervals of 9-12 months. Along this path, a company has the possibility to adjust processes continuously, and to create a learning process that incorporates both, the implicit knowledge components from different perspectives, the transverbal knowledge, and the transversal competencies of the parties involved in the process.

Fig. 6 depicts the resulting spiral process with respect to the agility and resilience of a developing organization.
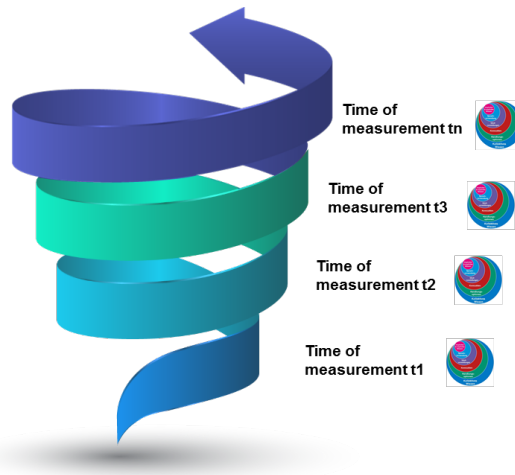
Fig. 6. Spiral development triggered by repetitive elicitation and development cycles

6 Conclusions

Markets and thus, organizations are continuously changing. Stakeholder knowledge increasingly becomes an essential asset to adapt to novel situations. In particular, implicit knowledge is key for operational process designs. We have developed and demonstrated a technique allowing organizations to elicit relevant implicit stakeholder knowledge and transform it to process models in a transparent and structured way. The presented case study exemplified for a bidding process how to identify stakeholder needs for developing and optimizing business processes while overcoming experienced deficiencies. The underlying question of such endeavors is

- "How can organizational work processes continuously be developed and optimized on the basis of the internal employee perspective aligned with the external customer view and customer needs?"

The case and development procedure showed the structured transformation based on an elicitation step addressing both, the internal employee view, and the external customer views revealing customer needs (in our example regarding the bidding process).

According to the achieved results, the involved stakeholder groups could develop their picture of an ideal bidding process and could compare it to the way they perceived it at the time being. They also developed options for action to bridge the gap between the current situation (as they perceive it), and how they envision the future process. In doing so, they used their implicit knowledge and process experience they had not articulated so far. By gaining deep and contextual knowledge on the offer generation process, the company could introduce significant changes on organizing work tasks, and thus, bridge the gap between the formal and informal offering process.

The most significant changes were:

- **Anticipate customer needs:** The company developed innovations based on the customer feedback on the processes developed and, most important, they developed processes that could anticipate customer needs – they could evaluate the data from digitally networked heating systems already before the customer could become beware of it.
- **Proactive Offerings**: Services were developed and proactively offered to customers. The customers were able to optimize their own work process by this approach without external intervention.
- **Recognition of implicit knowledge:** Employees have experiences that they normally cannot verbalize but that are relevant to process optimization. By becoming aware of their own implicit abilities they provided essential input to be able to quickly optimize the offering process. The most important change was the combination of previously separated work steps. They were composed in a way that sales, technology and technology work force coordinate themselves to act as a team, and jointly present offers to the customer. This step resulted in significant savings because questions that previously had to be clarified through many iterative process steps did not occur any more.
- **Promotion of self-responsibility**: Self-responsibility for processes is encouraged when employees understand the overall process and is of benefit for both, the organization, and the customer. The project and interventions qualified employees to reflect on processes thoroughly, and bring in their skills and perspective for change management. In this way, they became involved by individual engagement, and started identifying themselves with the bidding process. They took responsibility for the process design, and met each other regularly to discuss and implement minor optimizations. Finally, the company has managed to shift from managing isolated departments to a unified network of thinkers and acting stakeholders. Now, company A understands process chains as a single entity. Both, experiences and knowledge are shared and circulate within the entire organization.
- **Agile development of processes**: Resilience through agile process management has been enabled due to the employees' constantly reporting of failures and deviations from the idealized process. The organization is now on its way to becoming agile in terms of its corporate culture.

Overall, it seems the well-prepared elicitation and acquisition procedure pays off creating opportunities, even in times of less process agility, or increased pressure to innovate and re-organize.

REFERENCES

1. Allee, V., Schwabe, O., Babb, M. K.: Value Networks and the true nature of collaboration. Meghan-Kiffer Press, Tampa, Florida (2015).
2. Catalogue of Transversal Competences Key for Employability, http://key-start2work.eu/images/docs/o2-catalogue/O2_Catalogue_EN.pdf, last accessed: 11.11. 2017 (2017).
3. Dalkir, K., Beaulieu, M.: Knowledge management in theory and practice. MIT Press, Boston (2017).
4. Heisig, P.: Business process oriented knowledge management. In Knowledge Management. Springer, Berlin, Heidelberg, 15-44 (2003).
5. Hewitt, R. J., Jiménez, V. H., Bermejo, L. R., & Escobar, F.: Who Knows Best? The Role of Stakeholder Knowledge in Land Use Models — An Example from Doñana, SW Spain. Geomatic Approaches for Modeling Land Change Scenarios. Springer, Cham, 215-239 (2018).
6. Kelly, G., A.: The psychology of personal construct. Vol.1 & 2, New York, Norte, 1995.
7. Von Krogh, G., Ichijo, K., Nonaka, I.: Enabling knowledge creation: How to unlock the mystery of tacit knowledge and release the power of innovation. Oxford University Press (2000).
8. Nonaka, I., Takeuchi, H.: The knowledge-creating company: How Japanese companies create the dynamics of innovation. Oxford University Press (1995).
9. Shadbolt, N. R., Smart, P. R.: Knowledge elicitation. Evaluation of Human Work (4th ed.). CRC Press, Boca Raton, Florida, 16*3*-200 (2015).
10. Sperlinger, D.: Aspects of stability in the repertory grid. British Journal of Medical Psychology, 49, 341-47 (1976).
11. Stary, C., Maroscher, M., Stary, E.: Wissensmanagement in der Praxis:-Methoden-Werkzeuge-Beispiele. Carl Hanser Verlag, München (2012).
12. Vorhemus, U. Systemische Strukturaufstellungen (SySt) – Transverbal – Grammatisch, Wien (2015).
13. Walter, O.B., Schoeneich, F., Klapp, B.F.: Toward a comparable inter-element distance measure in repertory grids. In Fischer, J.C. (ed.) Challenging the boundaries, PCP perspectives for the news, Millenium Farnborough GB (EPCA Publications), 213-219 (2000).
14. Walter, O.B., Rose, M.: Mobile und stationäre computergestützte psychometrische Diagnostik, MoCoMed, 53-58 (2003).