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Influencing factors and methods for knowledge transfer situations in Product Generation Engineering based on the SECI model

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Abstract

Products are developed in teams and based on knowledge gained in previous development projects. This makes knowledge transfer a key factor for the success of product development. In addition is the development time a crucial factor. Increasing the speed of knowledge transfer is hence of great importance for product development. The SECI model describes knowledge transfer with four types of knowledge conversion and is used as a basis for a project which aims at increasing the speed of knowledge transfer in product development. This contribution describes the design and results of a workshop with experts as a descriptive study. The workshop was used to collect influencing factors for knowledge transfer as well as important transfer situations and estimate their relevance to align further investigations. Furthermore a generic framework is presented as a prescriptive study. The framework shows how transfer situations and conversion methods can be characterized and how measures for increasing the speed of knowledge transfer can be derived.

Keywords: PGE – Product Generation Engineering, Knowledge conversion, Product development

1 Introduction

The development of new products is always based on existing products. Already gained knowledge is reused or is at least a starting point for further development. Hence, successful knowledge transfer is of great importance for product development. Further, development activities are carried out in teams. Most often, team members have multidisciplinary backgrounds and knowledge must be transferred continuously between team members. In addition to the successful transfer of knowlegde, time is crucial for today‘s product development. Hence, the speed of knowledge transfer is a key success factor for PGE. Increasing that speed is therfore a direct support for product development. Aiming to increase the speed of knowledge transfers in PGE by methodical interventions, this contribution focuses on the following research questions:

- What are important influencing factors on the speed of knowledge transfers?
- What are important knowledge transfer situations in PGE?
- How can those situations be characterized as a basis to increase the speed of knowledge transfer?
- How can the speed of knowledge transfer in PGE be increased for knowledge transfer situations?

To answer the questions regarding important situations, influencing factors, conversion methods and their interdependencies, this contribution is structured as follows.
The second sections provides the relevant theoretical foundation of knowledge transfers and the PGE. While the third section provides the methodological approach of this contribution, the fourth section presents the design of an artefact to identify important knowledge transfer situations of the PGE and influence factors on the speed of knowledge transfers, which have been both validated by practitionners. Results of a workshop with knowledge management and product development experts are presented in a fifth section in regard to the the characterization and selection of relevant product development situations and in a sixth section in regard to the identification of relevant influence factors on the speed of knowledge transfers. Onbuilding, a seventh section provides the generic framework for the characterization of conversion methods by identified influence factors and situations. Through its demonstration, methodical interventions are selected exemplarily. The eigtht section discusses results and draws an outlook.

2 State of the Art

2.1 Knowledge Transfer

Knowledge is the totality of knowledge and skills that individuals use to solve problems (Davenport, 2000; Polanyi, 2009; Van Krogh, Ichijō & Nonaka, 2000). Motor and sensory abilities as well as experience knowledge belong to tacit knowledge, which is difficult to document. The fact that this form of knowledge often cannot be transmitted in language is often referred to as "stickiness" (Szulanski, 2000; Von Hippel, 1994). In contrast to tacit knowledge, explicit knowledge can be described and thus transferred by communication or explication methods such as graphics, images, texts and language (Lutz, 2008). The explicit knowledge is also bound to the intellectual experience of the knowledge owner and can be consciously processed, changed and learned together (Wilke, 2001; Franken & Franken, 2011). The transfer from one knowledge carrier to another can take place via written information and processing by reading or by means of a conversation. The transfer of knowledge thus forms an essential basis for the consideration of more complex, organization-wide knowledge-intensive business processes (Gronau, 2009; Maasdorp & Gronau, 2016). In a knowledge transfer, people try to make parts of their mental model tangible for others (Nonaka & Takeuchi, 1995; Xie, Zhou & Wang, 2017).

A knowledge transfer consists of the transfer process on the one hand and the content of the knowledge to be transferred on the other hand. The transfer process of knowledge between persons, groups, departments or branches within company boundaries is called internal knowledge transfer (Von Krogh & Köhne, 1998; Eisenhardt & Santos, 2002; Kriwet, 1997). The knowledge to be transferred can be differentiated according to relevance (Justus, 1999), scope (Von Krogh et al., 1998) and content (Warth, 2012). Various concept models have been developed to describe the transfer of knowledge (e. g. Maier, 2007; Shannon & Weaver, 1965; Van Krogh et al., 2000; Peinl, 2006; Disterer, 2000; Inkpen, 2008; Cummings & Teng, 2003; Minbaeva, Pedersen, Björkman, Fey & Park, 2003). The concept of knowledge conversion (Nonaka et al., 1995) is used to operationalize the process of knowledge transfer, which makes it possible to describe the duration of a conversion (Gronau, 2009; Gronau & Heinze 2014). The resulting operationalization of the transfer process makes it possible to observe the development duration. In the context of product development, the knowledge conversions specified by Nonaka and Takeuchi (1995) can be interpreted as follows (Table 1).

Table 1: Knowledge conversion according to the SECI model and its application in product development.

Knowledge Conversion	Activity	Real Settings in product development
Socialization (S)	Transfer of tacit knowledge between two or more people	Interdisciplinary exchange of ideas to generate solution ideas
Externalization (E)	Conversion of tacit knowledge into explicit knowledge	Capturing the technical specifications of a product, drawing of a product design
Combination (C)	Transfer of explicit knowledge	Database-supported analysis of customer requirements and competitor product characteristics for the feasibility of a new product
Internalization (I)	Conversion of explicit to tacit knowledge	Understanding a drawing

Table 1 shows the four conversions in the first column. The conversions are defined by the activity and described with examples from product development. The model forms the basis for the further procedure in the identification of influencing factors as well as the development of product development scenarios and selection of transfer methods.

2.2 PGE – Product Generation Engineering

PGE – Product Generation Engineering is an approach to describe the nature of product development projects. It is based on two main hypotheses (Albers, Bursac & Wintergerst, 2015), as the following clarifies.

First, every product development is considered to be based on at least one existing system. Such an existing system which serves as a reference for a development project is called "reference product". The development of a new product is therefore seen as the development of a new product generation, even if it is the first generation of a certain type of product. Reference products can be own preceding product generations from a company, but also competitor's products or products from other branches, for example. Thus, internal and external reference products can be distinguished from a company's point of view (Albers, Haug, Heitger, Arslan, Rapp & Bursac, 2016; Albers, Rapp, Birk & Bursac, 2017).

Second, the development of a new product generation can be described completely as a combination of three activities with which the subsystems of the new product generation are developed: a) some subsystems are carried over directly from reference products and only adjusted at their interfaces due to system integration. This is called "carryover variation"; b) if subsystems are developed new by maintaining the principle solution but redesigning the embodiment this is referred to as “embodiment variation”, and c) if the solution principle is developed newly it is “principle variation”. The share of newly developed subsystems consists of all subsystems, which are developed by embodiment variation or principle variation.

The reference products are an important basis for all three types of variation. An essential part of product development consists of reusing already existing knowledge, e.g. about how a certain function can be provided. This knowledge manifests in the reference products. However, not only generic technical knowledge is reused. Especially, when using internal reference products, the product documentation, which consists i. a. of CAD/ CAE models, prototypes and testing reports, is reused to a great extent. Even tacit knowledge from reference products is reused, in particular, if the developers of the reference product are available for the development of the new product generation. Therefore knowledge needs to be transferred from former development projects to running projects. More specifically, this is often the transfer of knowledge from one developer to another.

3 Research Method

To answer the questions regarding important influencing factors on knowledge transfer and important transfer situations in PGE a workshop with experts was conducted as a descriptive study (Blessing & Chakrabarti, 2009). The experts where from the area of knowledge transfer in general as well as from the field of product development in companies. The workshop concept is described in detail in section 4.

The questions of characterizing knowledge transfer situations and the derivation of measures to increase the speed of knowledge transfer are addressed by the development of a framework as a prescriptive study. The framework connects the influencing factors, the transfer situations and different transfer methods and is presented in section 6.

4 Workshop Design

The workshop design was carried out with 3 knowledge management experts and 3 product development experts. Both teams had the assignment to identify influence factors for the speed during knowledge transfer and to find relevant knowledge situations in the product development. The workshop design was carried out in three parts and experts were confronted with tasks considering their specific knowledge as follows.

Figure 1 describes the workshop design with the respective tasks in Part 1-3 and is supported by a legend to understand the data in the graphic. The blue task clusters follows the first research question, while the green task clusters deal with research question two. This ensures that both groups of experts contribute their expertise to both research domains.
First, the workshop design provides that the knowledge management team identifies the influence factors with the Brainwriting method. The premise was to identify factors by also considering the four conversions of knowledge transfer. All identified factors were then collected and classified to the four conversions visualized on the board. After this, a prioritization by the experts identified relevant influence factors for the speed of knowledge transfer.

At the same time, the product development experts had the assignment to collect relevant situations of knowledge transfer during product development in three determined tasks. The first task was a Brainwriting that asked for the drafting of experienced situations in knowledge transfer. To assist the experts, a designed template with characteristics such as number of persons involved, work material, explosive nature, hierarchy, culture and language, involved disciplines, time, duration and intensity as well as other relevant information was given to describe the situation complete. After this, the relevance of the situations has been deducted by the experts in using a scheme similar to the basic idea of a FMEA. The situations were valued by the following dimensions: importance for a product development project, frequency and intensity of knowledge transfer. The rating was based on a scale from 1 (= low) to 3 (= high). For a better visualization, the colors green, yellow and red were used for the values 1,2,3. The overall relevance was then derived from the sum of all values assigned by the experts. Subsequent to the evaluation, widely differing assessments of the same situation were discussed in the expert group.

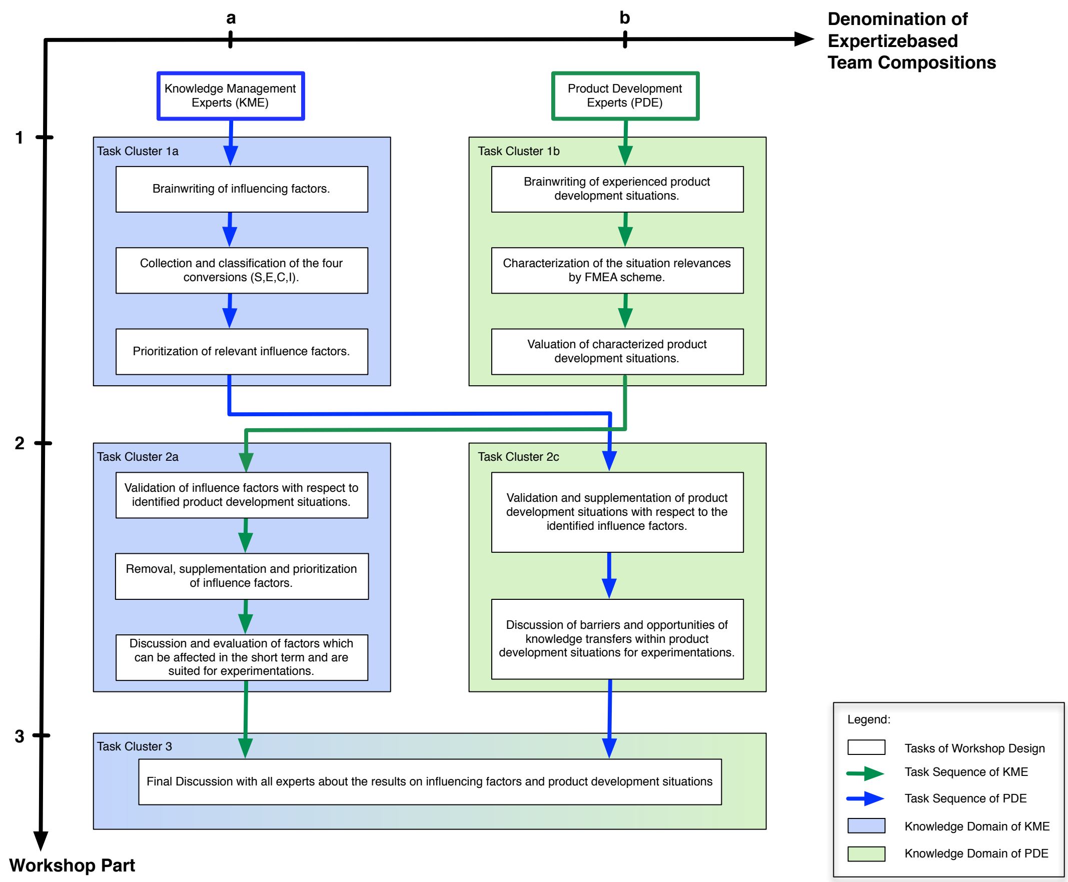

Figure 1: Workshop Design

In the second part of the workshop, the experts exchanged stations and worked out the respective tasks. The knowledge management group validated and completed previously identified product development situations considering previously identified influence factors. In the second step, the experts held a discussion on barriers and the positive effects of measures on the speed of knowledge transfer.

Meanwhile, the product development experts validated the influencing factors as follows: The task of the expert group on product development was to evaluate the collected influencing factors in a discussion by removing irrelevant factors considering previously identified product development situations as well as adding relevant factors and prioritizing those. In addition, the situations found in the first workshop part were taken into account in the assessment of the influence factors. In the third step, all the influencing factors were then discussed and evaluated for their ability to be influenced in the short term. Quickly changeable influencing factors were marked with a red arrow pointing upwards. If, on the other hand, a factor was regarded as difficult to influence or only with long-term effort, the arrow pointing downwards was used. A short-term changability was accordingly marked with both arrows.

In the final discussion, the situations and identified influencing factors were presented to all experts. Possible obstacles and barriers to knowledge transfer were discussed for selected situations. At the end promising positive interventions for the rapid transfer of knowledge in the knowledge-intensive situations in the product development have been summarized.

5 Factors Influencing Knowledge Transfers

Summarizing all workshop sessions, as they were described in section 3, influence factors have been identified and evaluated as can be seen in Tab. 2.

Here, one can see in the first column influence factors on the speed of knowledge transfers as they were identified during the Brainwriting and in regard to from literature identified categories completed during the discussion.
The appearence of the influence factor in available kinds of conversion can be found in columnts two (socialization), three (externalization), four (combination) and five (internalization).

For the evaluation identified parameters are visualized as follows:

- The normalized appearence of influence factors at all four kinds of conversion was derived and can be found in column six. This was denominated with c.
- The priority of knowledge management experts as it was evaluated during the first workshop session can be found in column six. This was denominated with k.
- The priority of product development experts as it was evaluated during the second workshop session can be found in column seven. This was denominated with p.
- The shortterm changability can be found in columng eight. This was identified by product development experts during the second workshop session having previously identified product development situations in mind. This was denominated with s.

Building on evaluations of Tab. 2, the relevance of influence factors r for an empirical evaluation were derived. Hence, factors were selected with the following intentions:

1. Factors were intended to be observable at all four kinds of conversions.
2. The evaluation of knowledge management experts and product development experts was intended to be considered equally.
3. Factors were intended to provide a shortterm changability.

Hence, important factors were selected by the highest relevance. This was determined as formula (1) shows:

$$relevance = c \cdot (\frac{k}{max_k} + \frac{p}{max_p}) \cdot s \qquad (1)$$

Here, max_k refers to the number of knowledge management experts and max_p refers to the number of product development experts. Both referred to $max_k = max_p$ =3.

Relavance values for each influence factor as they were derived considering evaluations of Tab. 2 can be seen in Fig. 2.

Table 2. Influence Factors Being Prioritized and Validated by Practitioners.

Influence Factor	Conversions				Evaluation			
	S	E	C	I	c	k	p	s
Willingness to Learn			X		0.25	0	0	0
Updated SW Systems		X	X		0.5	0	0	0
Thematic Interest	X		X		0.5	0	1	0
Thematic Broadness		X			0.25	0	0	0.5
Teameffects	X				0.25	0	0	0.5
Sympathy	X				0.25	0	1	0
Provisions with Meals, etc.	X	X	X	X	1	0	0	1
Noise	X	X	X	X	1	0	0	1
Management Support	X	X	X	X	1	0	0	1
Hidden Agenda	X	X			0.5	0	0	0
Helpfulness	X				0.25	0	0	0
große Schnittmenge				X	0.25	0	0	1
Euphoric Behavior	X				0.25	0	0	0
Constructive Asking					0	1	0	0.5
Concentrativeness	X	X	X	X	1	0	0	0
Affinity to Media		X	X		0.5	0	0	0
Feedback	X				0.25	0	1	0.5
Existence of Knowledge Transfer Rules	X				0.25	1	0	0.5
Transformation				X	0.25	0	1	1
Text Structure			X		0.25	1	0	1
Methodical Experience		X			0.25	0	1	1
Knowledge Access			X		0.25	0	1	1
Degree of System Automation		X			0.25	0	1	1
Media Selection		X			0.25	0	1	1
Technical Language	X	X	X	X	1	1	0	0.5
Media Experience		X	X		0.5	2	0	0.5
Individual and Organizational Barriers	X	X	X	X	1	1	0	0.5
Hands-on			X		0.25	2	1	1
Award-System		X			0.25	3	0	1
Atmosphere	X				0.25	1	2	1
Discipline	X	X	X	X	1	1	1	0.5
Tiredness	X	X	X	X	1	1	0	1
Personal Benefit	X	X			0.5	2	0	1
Gamification		X	X		0.5	0	2	1
Appointment	X	X	X	X	1	0	1	1
Honor	X	X			0.5	1	2	1
Confidence	X	X	X	X	1	3	1	0.5
Objective Clearness	X	X	X	X	1	2	0	1
extrinsic / intrinsic Motivation	X	X	X	X	1	0	2	1
Taskspecific Degree of Profession	X	X	X	X	1	3	2	0.5
Mother Tongue	X	X	X	X	1	1	2	1
Sufficient Time	X	X	X	X	1	1	3	1

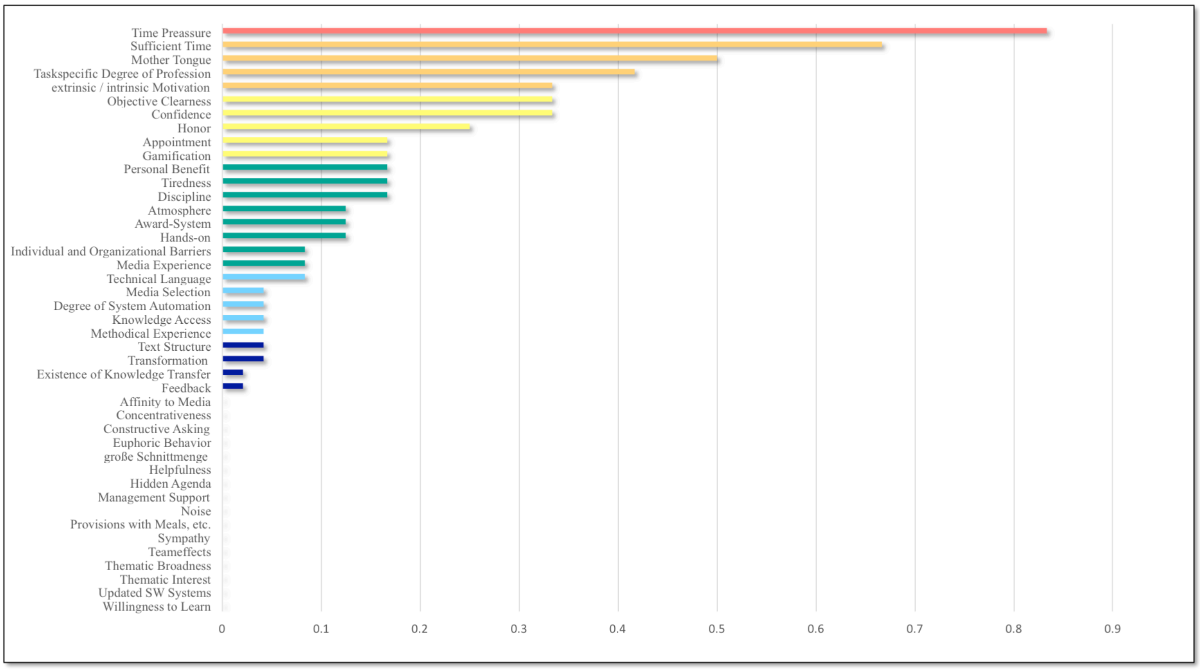

Figure 2. Influence Factors Being Ranked.

Faced with Fig. 2, one can see influence factors being ranked by the highest relevance on the top. Only the seven most important factors are mentioned in the following. The availability of a time preassure during a knowledge transfer shows the hightest relevance. At least, sufficient time must be available for this, such that knowledge can be transferred successfully. The use of the mother tongue during knowledge transfers is available at all four kinds of conversions and expected to increase the speed of knowledge transfers. Further, the availability of task specific competences is relevant and can be educated easily. When obectives of a knowledge transfer are clear, the speed of knowledge transfers is expected to be increased. If the convidence level of knowledge transfer participants is increased, the speed is assumed to be increased as well.

6 Identification of Knowledge Transfer Situations in PGE

Tab. 3 and Tab. 4 of the appendix show the collected description of knowledge-intensive product development situations, which were identified in the workshop. They are characterized by the definition of workshop participants.

For the evaluation identified parameters are visualized as follows:

- The impact of a product development situation refers to its meaning in the everyday business as it was evaluated from product development experts during the first workshop session. This was denominated with m.
- The frequency of a product development situation was interpreted in regard to its occurrence in the everyday business and it was evaluated from product development experts during the first workshop session. This was denominated with f.
- The intensity of a product development situation was interpreted in regard to the everyday business as it was evaluated from product development experts during the first workshop session. This was denominated with i.

Building on evaluations of the workshop session about situations of Tab. 3 and Tab. 4, the evaluation values are visualized in Fig. 3 by colors. The relevance of each situation r was derived as formula (2) shows. The most important situations then can be selected by the highest relevance:

$$relevance = m + f + i \tag{2}$$

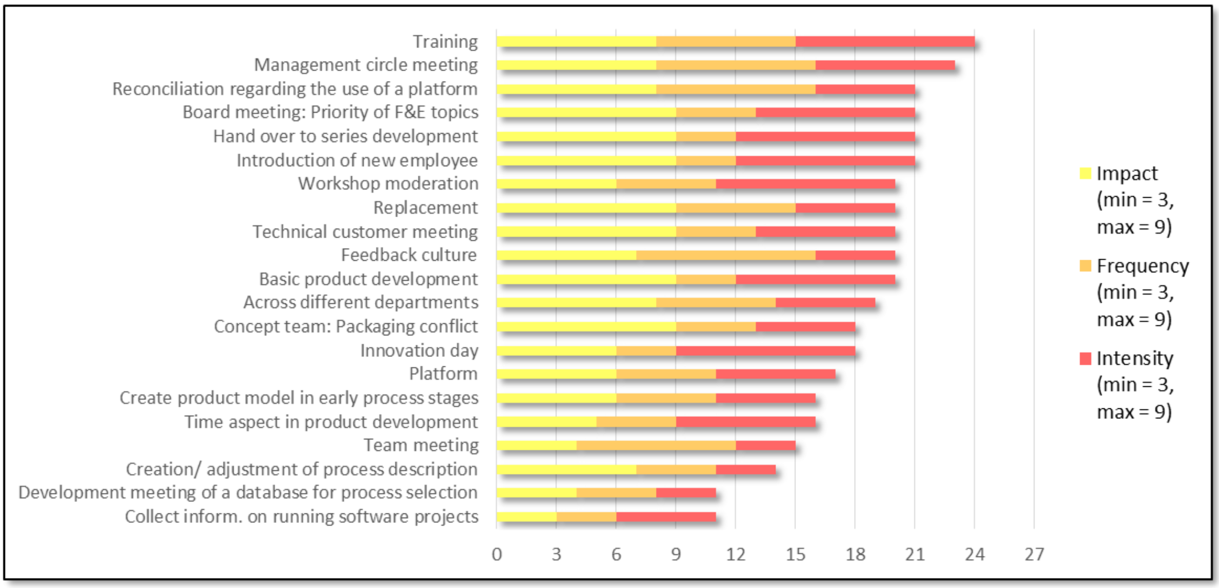

Figure 3. Ranking of knowledge-intensive product development situations.

Faced with Fig. 3, one can see knowledge-intensive product development situations being ranked by the highest relevance on the top. Only the most important situations are mentioned in the following. Two third of the mentioned items (14 of 21) have a rating in the top half of the possible range (18 to 27 pts.). A couple of the mentioned items can probably be found in most companies and development projects. This could be for example the "technical customer meeting", "concept team: packaging conflict" or "create product model in early process stage".

Some situations seem to have some similarities, for example "training", "introduction of new employee" and "replacement" seem to include a long time span. However, one can observe that the mentioned situations have different levels of detail and time spanning. A "team meeting" time can last up to two hours, while an "innovation day" refers to even two days. This is important since more than one type of knowledge transfers following the SECI model can be found in longer situations and a precise situation analysis is needed in order to determine occurring knowledge transfer types.

Potential for controlled investigations and hence, situations suited for experimentations can be found in student projects. Here, knowledge transfers from supervising students of higher semesters to students in projects can be connected to for example the "replacement" situation mentioned in the workshop. Hence, it can be assumed that insights gained in investigations within student projects can be transferred to development practice.

7 Framework to Enhance the Speed of Knowledge Transfers

A more detailed description of knowledge transfer situations is achieved by characterizing them with the identified influencing factors on knowledge transfer. Every influencing factor is understood as a parameter, which can have different parameter values. A characterization of a knowledge transfer situation is given by the set of specific parameter values from all factors in each situation. The idea is displayed in the Fig. 4.

Further, knowledge conversion methods are characterized by the same influence factors. Since different conversion methods ask for different settings, the most appropriate conversion method can be identified for a specific situation. Externalising knowledge about a technical system with a high complexity is for example easier when using a 3D CAD model rather than a sketch. On the other hand is a sketch more appropriate for the exteranlisation of ideas with less complexity where a 3D CAD model would be more complex than necessary and would therefore need more time to be understood in a subsequential internalisation. This idea is also visualized in Fig. 4.

Influencing Factor/ Parameter	**Parameter Value**	**Situation characterization**		**Conversion method characterization**	
		Management circle meeting	…	*3D CAD model*	*Sketch*
Complexity of knowledge	High	X		X „Match“	
	Medium				
	low			„Mismatch“	X
Factor 2	Param. 2.1				
	Param. 2.2	X		X	X
	Param. 2.3				
…	…	…	…	…	…

Figure 4. Framework for the identification of situation-specific, appropriate method matches.

In this figure, one can see a characterization of knowledge transfer situations (her product development situation) and transfer methods using parameter values of identified influence factors. A "match" indicates that a transfer method is suitable for the given parameter value.

Based on the framework depicted in Fig. 4, two possible types of interventions increase the speed of knowledge conversion: On the one hand, the conversion method can be changed. On the other hand, measures to change parameter values of influence factors can be changed. A third option to increase knowledge transfer speed, which is not considered by the framework so far, is the modification of the sequence of transfer situations or conversion methods, for example from socialization-internalization-externalization to internalization-externalization-socialization.

8 Outlook

The next step a more detailed and empirical analysis of the impact of most relevant influencing factors for the speed of knowledge transfers is planned. This will be done in a laboratory study with students where the influencing factors can be controlled sufficiently. The results will form a model that allows a better understanding and management of knowledge transfers.

In regard to knowledge transfer situations in PGE, a procedure will be developed, which guides the analyzation of knowledge transfers in specific situations and enables the identification of knowledge transfer problems. This procedure will be applied exemplarily in project works of students.

Based on the gained results and identified problems as well as the presented framework interventions will be conceptualised and carried out to improve the speed of knowledge transfers within projects. The success of those interventions will be evaluated using the same approach like in the situation analysis.

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Appendix

Table 3. Transcript of knowledge-intensive product development situations.

Title	Descript.	No. of people	Material	Time
Collect inform. on running software projects	*Collection of projects and their contents -> followed by prioritisation*	*approx. 40*	*Excel list; e-mail*	*30 min*
Development meeting of a database for process selection	*A service provider develops a database to simplify the process.*	*approx. 3 Developers + 4 process experts*	*ppt; Prototypes; Process description; Specification sheets*	*2h*
Creation/ adjustment of process description	*A new work instruction is created or revised.*	*1 -> N*	*Pdf; Paper; Online*	*couple of hours*
Team meeting	*Employees and team management exchange views on current topics*	*approx. 10-15*	*ppt; Protocol - Word; Process description*	*1,5h*
Time aspect in product development	*fast-moving; no time for explanations*	*2 to 5*	*information technology*	*complete PDP*
Create product model in early process stages	*at the beginning, a product model is created in order to decide which aspects should be newly developed*	*on conversation: 2, 70 conversations*	*Excel document with many columns (approx. 25) and 2000 rows*	*2h for one conversat ion*
Platform	*1. make the knowledge available! 2. need/appropriate knowledge!*	*1-n n-1 ratio*	*Information technology-Tools*	*approxim atly 1-60 min*
Innovation day	*Pre-development results are presented to developers at a fair.*	*250 exhibitors; 2500 visitors*	*posters; videos; demonstrators; ppt*	*2 Days*
Concept team: Packaging conflict	*A new component does not fit into the vehicle => problem solution*	*approx. 10*	*CAD, ppt*	*2h*
Across different departments	*Sales - IT - Developers - Engineers - Manufacturing*	*10 people*	*own, differently used tools*	*Develop ment Process*
Basic product development	*from customer-specific -> basis -> customer-specific*	*Team 5-15*	*information technology*	*1 year*
Feedback culture	*Questions (understanding); giving feedback*	*1 to 5*	*tool; verbal*	*1-3 min*
Technical customer meeting	*Discussion at the customer's site about new design*	*2+*	*PP; sketch*	*2-3h; repeatedl y*
Replacement	*Knowledge actively, intentionally not sharing to maintain internal competitive advantage*	*1*	*all*	*long time*
Workshop moderation	*Moderator supports the development of a common solution (product/process)*	*1 -> 7-10*	*moderation tools*	*4h*
Introduction of new employee	*New employee comes to the company with no special background knowledge, special knowledge*	*N -> 1*	*personal discussion; training material; walkthrough*	*6-12 months*
Hand over to series development	*Developed process step is transferred to the series*	*1-> N*	*Training documents; training on site*	*couple of days*
Board meeting: Priority of F&E topics	*Board decides which projects are prioritized as pre-development projects*	*10 board members; 20 presentations; 20 admin*	*presentation*	*3h*
Reconciliation regarding the use of a platform	*Developments of two brands coordinate the use of identical components.*	*approx. 6 per brand ; approx. 4 brands*	*Excel list; database; videoconference*	*3h*
Management circle meeting	*Monthly information event for the information of the other business managers*	*approx. 10*	*ppt*	*2h/ a month*
Training	*Focus on cross-generational knowledge transfer*	*approx. 2*	*PC, Conversation*	*1 hour -> 3 years*

Table 4. Transcript of knowledge-intensive product development situations (continued).

Title	Brisance	Hierarchies	Cultures/ Languages	Disciplines
Collect inform. on running software projects	*low*	*clerical assistant*	*german*	*computer sciences.; Engineering sciences*
Development meeting of a database for process selection	*moderate/low*	*Developer;clerical assistant*	*german*	*computer sciences.; Engineering sciences*
Creation/ adjustment of process description	*Important, because there has to be the same, general procedure within the company -> customer requirement*	*Head of department; Employees*	*can be difficult with foreign plants*	*Technical development; manufacturing*
Team meeting	*low*	*Employees and team leaders*	*german*	*Engineering sciences,*
Time aspect in product development	*Effects at the end of a project*	*different 1st level*	*none*	*different departments*
Create product model in early process stages	*effort high; Incorrect entries => many resources Resources => medium*	*Everyone in the company; 1 discussion between clerk and designer/BT*	*german*	*computer sciences.; Engineering sciences, electrical engineering*
Platform	*of self-interest -> relevant to the company*	*none*	*Attitude/ different language*	*all departments*
Innovation day	*low*	*all*	*german*	*all in companies; economists to engineers*
Concept team: Packaging conflict	*moderate*	*Developer;clerical assistant*	*german*	*Mechanical Engineering*
Across different departments	*very HIGH*	*2 levels*	*none*	*all that are involved*
Basic product development	*high -> impact of competitive positioning*	*3-4 levels*	*none*	*Computer science, mechanical engineering, planning, research and much more.*
Feedback culture	*relativly low*	*same level; 1 level difference*	*/Language/Culture: very important*	*different*
Technical customer meeting	*High, as future sales may depend on it*	*same level in generall*		*Technical Departments*
Replacement	*low and up to company wide*	*none*	*/Language/Culture: very IMPORTANT*	*all departments*
Workshop moderation	*moderate*	*different 1st level*	*german*	
Introduction of new employee	*High, as independent work is required and representation of the company to the outside world*	*generally different; depending on department and situations*	*not relevant*	*Manufacturing; Specialists*
Hand over to series development	*high, since customer requests and requirements depend on this process step*	*Developers -> Production staff*		*Development department; Manufacturing*
Board meeting: Priority of F&E topics	*very high -> strategic decision as to what the company should prefer*	*Management*	*german*	*Developers, decision makers*
Reconciliation regarding the use of a platform	*decides on money and responsibility -> politically controversial => high*	*Developer & Administrator -> later top management*	*german, english*	*Mechanical Engineering, electrical engineering*
Management circle meeting	*Important, information about the situation of the company*	*GF, GL, Head of department*	-	*all*
Training	*different; very high for companies that would otherwise have to fear an outflow of know-how*	*different 1st level*	*no problem*	*foreman/master craftsmanr,assistant <-> apprentice*