K.exchange -

A Systematic Approach to Knowledge Transfer of the Aging Workforce

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Abstract: Managing knowledge of the aging workforce is a major challenge, particularly to companies in the aerospace industry. Whenever an expert or manager retires or takes up a new position, there is the risk of losing his or her knowledge about what it really needs to fill his/her position. Apart from the risk of losing expert knowledge about administrative or technical issues, there is also the risk of losing distinct, personal social networks which are needed for gathering information or synchronising with colleagues. Without knowing informal relationships within complex organizational environments, it is quite impossible to solve cross-departmental problems and take relevant decisions.
While the importance of experts' and managers' knowledge about internal and external social networks is widely recognized, especially in aerospace companies, practical concepts and systematic approaches to allocate mainly experience-based knowledge, however, are still in the stage of early development. Our research-based approach, developed as a spin-off from the Technical University Berlin and the Fraunhofer-Institute for Production Systems and Design Technology with more than six years of experience and applications mainly in the aerospace industries, has contributed to a detailed set of methods to systematically support the retention of knowledge – both the experts' technical knowledge and the experience-based knowledge about social networks and, in terms of executives, management style. This approach is presented here and illustrated by a case study that demonstrates how valuable knowledge could be saved for the benefits of Airbus.

Keywords: knowledge management; knowledge retention; knowledge exchange; knowledge transfer; human resource management; experience based knowledge; management knowledge or management style; social network; age; aging workforce; retirement; aviation; aerospace company; Airbus

1 Background

1.1 Challenges to Knowledge Management in the Aerospace Industry

Aerospace companies are built around complex organizational structures. These structures are characterized by complex design and manufacturing processes, distributed work shares across different sites and global subsidiaries, and a deep integration of suppliers. In suchlike environments, cross-departmental problems arise in everyday practice. To cope with these challenges, employees need more than just knowledge about technical or administrative issues. They need to swap ideas and collaborate with experts from other teams, different organizational transnational units, external companies or research facilities.

As outlined by Gurwitsch (1971), most people are experts within a very small domain of knowledge only – within a domain where they have directly gained experience and acquired first-hand knowledge.[1] With regard to all other domains, they are not an expert. But indeed, they know that there are other people who are experts within these other domains and that they could ask them for advice.[2]

Locating relevant contact persons, though, becomes even more challenging in complex organizational environments. Especially in large organizations, where workflows are dominated by the division of labour and specialisation, the available knowledge is not in the possession of every individual employee. Rather, knowledge is divided between the organization's members according to their professional fields. The knowledge about this division itself is part of the people's stock of knowledge. Today, however, specialized knowledge cannot be assigned to only one professional field or a department. The professional division of knowledge within an organization, and even more within society, of course, continues to exist, but vanishes more and more. The existence of specialized knowledge and expertise beyond clear-cut professional fields and organizational boundaries originates from a growing importance of the co-existence of specialized knowledge with general knowledge and competencies, specialisation within professional fields, chances of professional structures, and, above all, the diversity and the growing non-linearity of individual work biographies [cf. Müller-Prothmann, 2006].

Therefore, social interfaces to people who have access to required information, expertise, scarce resources or decision makers are mandatory for every employee to solve problems efficiently and on his/her own authority. Whenever an engineer or manager is going to abandon his/her current position, the challenge to knowledge management (KM) is not only to transfer the required expert or management knowledge from leaver to successor, but to maintain the existing social network by transferring (or handing over) the leaver's social interfaces and known key people.

1.2 Germany's Aging Workforce Raises Needs for Systematic Knowledge Transfer

It usually takes years of working for a company before an employee has built up a social network consisting of helpful informal linkages which enable him or her to solve even complicated, cross-departmental problems independently and efficiently. In other words: The knowledge about existing social networks is personal, mainly experience-based and therefore hard to retain and to transfer – that means hard to manage [cf. Müller-Prothmann 2005, 2006].

From the perspective of social construction of knowledge [cf. e.g., Holzner, 1968; Berger and Luckmann, 1967; Schütz, 1971], we cannot manage knowledge: "data and information may be managed, and information resources may be managed, but knowledge (i.e., what we know) can never be managed, except by the individual knower and, even then, only imperfectly" [Wilson, 2002; cf. e.g., Wersig, 2000; McDermott, 2002]. Rather, we can try to influence and optimize knowledge related processes and communication. Then, KM "deals with conditions and influence factors

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[1] This kind of knowledge is known by James (1981) as "knowledge about".
[2] James (1981) would call this kind of knowledge "knowledge of acquaintance".

of knowledge generation, sharing, use, conservation, and forgetting on individual, organizational, and societal levels" [Müller-Prothmann, 2006].

Taking into consideration the demographic change taking place in Germany, the retention of experience-based knowledge becomes even more a challenge: While 62 per cent of Germany's workforce is aged between 15 and 44 today, in 2020 this age group will decrease to 54 per cent and more than 45 per cent will be between 45 and 74 years old, as outlined in a study by the Institut der deutschen Wirtschaft Köln [IW Köln 2005].

As a consequence of Germany's aging workforce on the one hand and the strong knowledge intensity in aerospace companies on the other, the need for systematic knowledge retention and KM methods rapidly increase in the companies' strategies to sustain and strengthen their competitive power.

1.3 Wanted: A Systematic Transfer of Technical and Experience-Based Knowledge

By now, the importance of systematic knowledge retention is widely recognized and KM has undoubtedly become of primary importance to industry: According to a survey by the Economist among 1,000 leading managers, KM investments have gained the second highest priority with 30 per cent after marketing and sales investments with 36 per cent [Economist Intelligence Unit 2007]. Another survey among KM professionals [Müller-Prothmann 2006] identifies "knowledge sharing" as the biggest challenge for the future development of KM and "personal networks and communities" as the most important KM concepts in R&D environments, mentioned by 84.6 per cent of the participants.

Although managers obviously hold KM activities dear, practical concepts and systematic approaches to share both experts' technical knowledge and experience-based knowledge about social networks are still in the stage of early development. Above all, the localisation and transfer of expert knowledge is a big challenge to aerospace industry and a main task of KM decision makers.

2 K.exchange - A Systematic Approach for Expertise Transfer

2.1 Main Elements of K.exchange

Reflecting the dichotomy of the required knowledge in aerospace companies as mentioned above, both the transfer of the technical expert knowledge and the transfer of social interfaces loom large for aerospace companies' KM activities.

To be able to realize a transfer considering both types of expertise, a flexible knowledge exchange approach labelled "K.exchange" has been developed. The objective of K.exchange is to provide applicable methods and processes to minimize knowledge loss in case of key people moving and, in that way, to enable and support continuous knowledge transfer from experienced people across generations. K.exchange is built on the following four main elements [Figure 1]:

- a *process*, ensuring a systematic and standardized approach,
- a *transfer network*, ensuring a stable embedment in the organization,

- a *transfer cell*, ensuring the professional operation of the individual case,
- a variety of *transfer methods*, ensuring the appropriateness of the transfer approach for the specific situation, flexible enough to transfer expert knowledge as well as experience based knowledge about, e.g., social interfaces/networks/key people and/or management style.

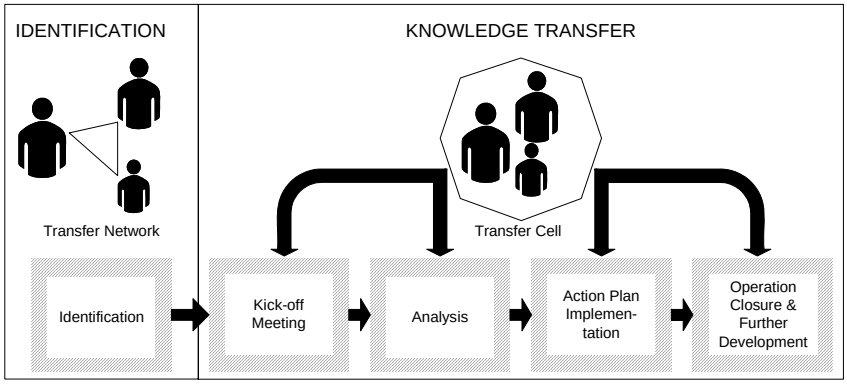

Figure 1: Knowledge Exchange Concept

2.2 Basic Steps of K.exchange

The K.exchange process consists of five basic steps: identification, kick-off meeting, analysis with action plan, implementation of the knowledge transfer actions, and finally closure and evaluation phase [for a detailed description of the knowledge exchange approach as developed at Airbus, called "ExTra", cf. Katzung, Fuschini and Wunram 2006].

1 *Expert identification* locates the person or group with the relevant knowledge that is to be transferred. This task becomes even more challenging in complex organizational environments where movements of employees, transfer of work shares and re-organization activities happen constantly. The need for knowledge transfer actions may stem from different reasons, e.g. retirements, change of position in the company, people leaving the company or transfer of activities between organizational units. In each case, the process step "Expert identification" must ensure that all candidates are localized and considered for knowledge transfer. So-called transfer networks consisting of human resources (HR) representatives, local management representatives, and KM representatives help to identify all candidates in-time.

2 *Kick-off meeting:* After the successful identification of a candidate for knowledge exchange, the so-called transfer cell schedules a kick-off meeting. The transfer cell is made up of the knowledge provider, the knowledge receiver, the direct superior, and the process coordinator who plays a central role as the main facilitator of the transfer process. The process coordinator has various responsibilities, e.g., to ensure the correct implementation of all

process steps, to summon the kick-off meeting, to perform the analysis, to prepare the action plan, to ensure that the actions are finished and to facilitate specific transfer actions. Due to the fact that certain issues need to be synchronized with the human resource department, a participation of HR representatives in the kick-off meeting is recommended as well.

3 *Analysis and action plan:* After the kick-off meeting, the K.exchange coordinator performs an analysis. In semi-structured expert interviews with the knowledge provider, the knowledge receiver(s), the manager (strategic perspective) and optional some colleagues of the experts' working environment, the requirements, needs, objectives and expectations of all participants involved are identified. In this step, the focus is on the knowledge provider. Though, it is also recommendable to interview his/her colleagues to get an idea of the provider's role within a social network as well as an idea of the network itself. The result of the analysis is a detailed action plan tailored to the respective situation. This plan defines relevant knowledge areas and specific transfer actions. It will be implemented by the transfer cell.

4 *Implementation of knowledge transfer actions:* Within the transfer cell different methods are used to facilitate and support the expertise transfer, depending on the situation and needs of the participants involved [Figure 2]. The set of methods includes, for instance, facilitated transfer talks and workshops, an organized personal contact transfer, a structured overlapping period and the preparation and implementation of complex training modules. Facilitated transfer talks as well as special network workshops, in particular, are appropriate to transfer knowledge about helpful social interfaces to colleagues or implicit knowledge about a proven management style. During these workshops, the facilitator's role is to motivate the leaver to tell some anecdotes about extraordinary work situations, e.g., by asking stimulating questions. Anecdotes as well as metaphors often convey parts of the narrator's implicit knowledge about how to manage certain problems successfully. That way, facilitated talks can make the leaver share his/her knowledge and experiences about both informal cross-connections and his/her way to use, sustain and strengthen those social interfaces.

ACTION PLAN IMPLEMENTATION	o Facilitate talks (triad talks) o Transfer personal contacts and network o Facilitate workshops o Write lessons learnt o Organise a "documents, archives and devices clear out" o Contribute to a book of knowledge o Manage a forum including FAQ (helpdesk) o Create/animate a training module/lecture o etc.

Figure 2: Knowledge Exchange Methods

5 *Evaluation* with a closing session and a feedback questionnaire: At the end of this process, the success of the actions is evaluated by using a dedicated feedback questionnaire. Either the needs of the transfer cell members are met

and the process is formally closed (closure phase), or, in case that additional transfer actions become necessary, the action plan is completed with further actions.

In comparison to other methods of knowledge transfer which show similar approaches[3], the knowledge exchange approach presented here has its' unique advantages through the integration in the organization by using transfer networks as well as through its flexibility to transfer both technical expert knowledge and experience-based knowledge. Methods and approaches to analyse and facilitate knowledge communication in networks based on social network analysis can be found in various other publications [e.g., Müller-Prothmann and Finke 2004, Müller-Prothmann 2005, 2006].

2.3 Expert Identification and Role of HR

Within the transfer networks outlined above, HR representatives play an important role. Their task is to track a proactive and systematic identification process in terms of leaving/moving experts and managers who are potential candidates for K.exchange. The relevant facts (name of leaver, position, name of superior, date of retirement etc.) are communicated in time to the KM representatives and to the respective management representative. Then the management representative decides on the launch of a knowledge transfer and defines one or more adequate successors. Once a candidate is chosen the identification phase will be closed and the first phase of the transfer process is to be launched [Figure 3].

As a certain time frame is necessary to organize at least a "small-sized" knowledge transfer before the expert or manager leaves, the identification of candidates, confirmed by the local management, should be completed at the latest 4-6 weeks before the retirement or movement date.

In terms of unexpected movements due to, e.g., reorganization activities or short-term notice, the management or the KM representatives are contacted directly by the person leaving and they will kick-off a limited version of the K.exchange process. Under nearly all circumstances, the transfer network ensures that appropriate actions can be launched

Although K.exchange can be theoretically initiated without appointing a successor at the very beginning, the identification of an adequate successor is of utmost importance for the HR representatives and the local management. Above all, the transfer of experience-based knowledge is more likely to be successful when the moving expert and his successor get to know each other and interchange knowledge face-to-face.

Furthermore, it is highly recommendable to inform all participants in the run-up to the knowledge transfer process about the purpose of K.exchange and their roles within the process. Preliminary information can help reduce scepticism and strengthen the participants' commitment.

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[3] Such as the "Wissensstafette" developed by Volkswagen Coaching, for instance [cf. e.g., Haarmann and Burski 2003, Güttel and Zeitlhofer 2005].

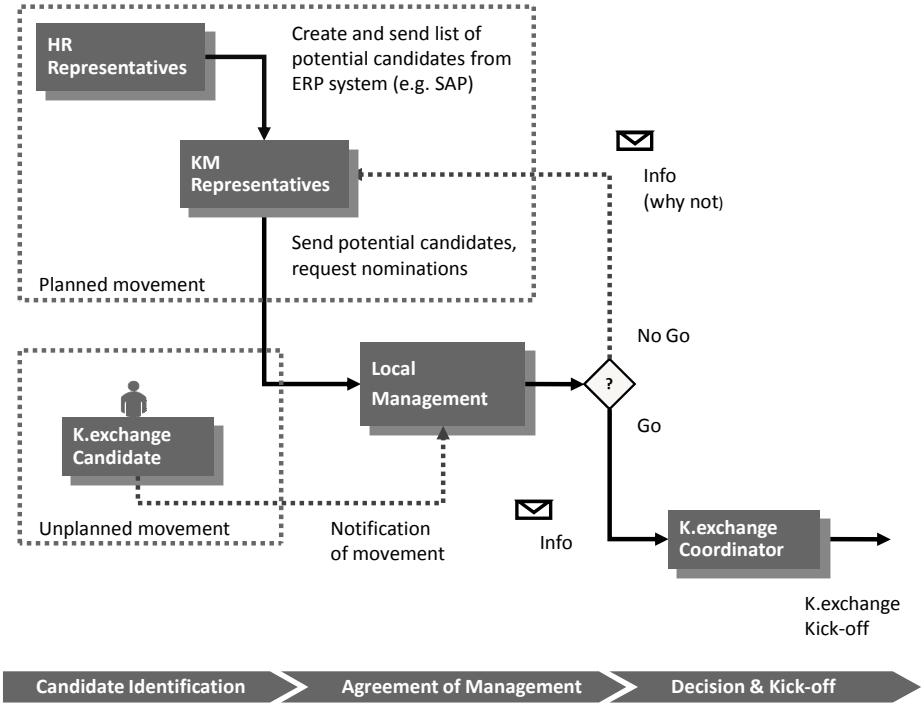

Figure 3: Identification Process

3 Case Study: Knowledge Retention at Airbus

3.1 About Knowledge Management at Airbus

Airbus, employing about 57,000 people, is one of the world's leading aircraft manufacturers. The company disposes of a complex organizational structure integrating distributed work across 16 transnational sites, international supplier companies and complex design and manufacturing processes. The paradigms of concurrent engineering and extended enterprising are drivers for major company policies. With a track history of technological firsts that includes fly-by-wire and the introduction of composite materials, Airbus continuously operates at the forefront of knowledge and innovation.

The aeronautic industry is an area where new product development and production are based on very knowledge intensive processes. Engineers are in a continuous tension, bridging newest technologies and research on the one hand with profound knowledge and deep experiences from long lasting programmes (with a product life cycle of 30 years) on the other hand. It is thus that KM takes an important role in the company's strategy to strengthen its competitiveness.

Airbus embarked on KM already in 1993/1994, in Germany mainly triggered by negative experiences in a painful restructuring program (the Dolores project, 1993-1997). A significant number of experienced engineers were dismissed or sent into

retirement. As a consequence, a substantial amount of knowledge was lost for the entire organization and had to be rebuild with a considerable effort. Starting with small bottom-up initiatives, the company investigated the early concepts of KM and initiated first pilot projects [cf. Hoyer, 1999]. Since then, KM activities have been continuously extended with a focus of application in the engineering department, the most knowledge intensive sector of the organization [cf. Haas, Aulbur and Stautz, 2000; Haas, 2000]. With the integration of the four national companies into one large organization and the merging of the national KM departments and solutions, KM obtained an additional boost and was implemented into a major company improvement programme (Route 06) then [cf. Mayrhofer, 2006].

One of the most important business needs the Airbus KM team has to address is the retention of knowledge and experience when employees are abandoning their position. While the KM initiative had focused more on the development of technical and documentation based systems in its early phases [cf. Langenberg and Dotter 2003], more interaction-based solutions have been implemented in the meantime. These solutions are based on face-to-face communication and on computer mediated person-to-person communication and have been introduced for achieving a balance between the codification and personalisation dimensions of KM [cf. Hansen, Nohria and Tierny 1999]. By now, Airbus has implemented a portfolio of KM solutions with a blended approach, i.e. comprising both solutions for codification and personalisation.

The following case study is not a typical one, but more appropriate to demonstrate, first of all, that social relationships at work have an influence on KM activities, and, in the second place, that even in challenging situations the knowledge exchange approach can achieve real benefits [for a presentation of the case study in more detail, cf. Weber et al. 2007]. In contrast to the case described here, most knowledge exchange operations run quite smoothly with a warm welcome from all participants [cf. the case study described in Katzung, Fuschini and Wunram 2006].

Prior to the knowledge transfer, in some situations the implementation of the knowledge exchange approach requires first some corrections of the work content as the case study shows. Furthermore, it emphasizes the significance of the facilitator and process coordinator. Data and names used in this case study were changed and made anonymous by the authors.

3.2 Kick-off and Analysis

Mr. D. is going to drop out of his department and take early retirement in nine months. He is 60 years old and known within his department as a senior expert (knowledge provider). A preliminary telephone interview with Mr. D.'s direct superior Mr. B. reveals that there has been a hierarchical conflict between him and Mr. D., which, however, could be eased through mediation by the works council. Mr. B. is aged 37 and has been the direct superior of Mr. D. for two years. A successor of Mr. D., that means a knowledge receiver, is not known yet.

Not only this preliminary information, but also the course of the kick-off meeting and the verbal comments by Mr. D. suggest that towards the end of his career, Mr. D. has already distanced himself from his job, his department and also from the whole company – it seems as if Mr. D. wants to show by his behaviour and statements during the kick-off meeting that, indeed, he will still complete the tasks he is required

to complete, but beyond his routine jobs no further commitment can be expected from him.

At first, the impression gained in the kick-off meeting is confirmed during the first analysis interview with Mr. D., who himself says that he only passively reacts but doesn't really act. But when Mr. D. starts talking about possible improvements the analysis interview takes a turn. Mr. D. explains quite enthusiastically that the documentation of components related to different system developments of older programs need to be improved. This is an area, he says, where others fall back on his knowledge until today. When he retires, his know-how will be lost for the department and the company. The first analysis interview bit by bit reveals that Mr. D. has been thinking for years about a project aiming at the comprehensible documentation of all components used in the past and present.

Furthermore, Mr. D. expresses his idea of a process ensuring the timely information of designers about existing designs that should be established in order to avoid double work in the future. He explains how this project could save time and money and tells about his attempts to discuss this idea with superiors. Although he had proposed this project on several occasions to his superior, who was also convinced of the associated benefit, the project has not been implemented so far. Mr. D. suddenly seems to be a totally different person: While the first part of the analysis interview is characterized by lethargy, he, by now, describes with enthusiasm how the project could be organized. It seems as if this project is something he would like to leave behind for his colleagues. When asked with whom he would like to implement this project, he prefers his new colleague Mr. E., who thus would be an adequate candidate for the role as the knowledge receiver in the subsequent transfer process.

During the analysis interview with Mr. D.'s superior Mr. B., the facilitator/process coordinator mentions the project proposed by Mr. D. and puts emphasis on the chance to retain expertise for Airbus. The analysis interview with Mr. B. finally reveals that he has already thought about how to familiarize Mr. E. with his new job. Reflecting that Mr. B. is strongly interested, in principle, in retaining Mr. D.'s know-how, this new constellation, i.e. Mr. E.'s job familiarisation on the one hand and knowledge retention on the other hand, provides sufficient synergies and a cost/benefit ratio reasonable enough to justify the project. In the course of K.exchange, Mr. B. not only appoints Mr. E. officially as Mr. D.'s successor (knowledge receiver), but also confirms the benefit and his willingness to support the project. He emphasizes once again that the knowledge transfer should be given special priority in the project.

3.3 Implementation of Transfer Actions and Results

As a first step, the facilitator/process coordinator arranges and facilitates a kick-off meeting to launch the documentation project suggested by Mr. D. and, for the first time, invites Mr. E. to participate. To ensure continuous progress in terms of the knowledge transfer from leaver to successor, which means from Mr. B. to Mr. E, the facilitator/process coordinator regularly organizes and moderates project debriefing meetings during the following months.

A lessons learnt database is used to capture the knowledge brought forward and a crosslink to an already existing KM project for the long-term archiving of knowledge is created. At departmental level, the know-how related to the two specific areas of expertise is transferred by means of presentations. As the months go by the

relationship that develops between Mr. D. and Mr. E. can be described as some kind of mentoring relationship which is not only restricted to the project.

The case finally took an interesting turn: What started as a demotivating situation for the knowledge provider could be changed into a stimulating work environment? The facilitator/process moderator could bring about a rebound by slightly changing the work content and uncovering hidden inspirations. This means that new challenges were discovered and allocated to the job which sparked the job holder's interest in transferring his expertise and, at the same time, motivated his personal involvement and efforts again:

- More social interaction: Mr. E. is assigned to Mr. D. to help him with the project. Thus, knowledge can be implicitly transferred.
- New challenges: Mr. D. is no longer underemployed but can independently organize and carry out a project.
- Meaningfulness: Mr. D. is given the opportunity to perform a project which is considered as meaningful by him (and the organization).

This case study points out the central role the facilitator/process coordinator is playing within K.exchange. A successful course of this knowledge exchange process was achieved through the facilitator's/process coordinator's intervention and a management that enabled Airbus to retain its employees' knowledge so as to save costs and improve the quality of work. Furthermore, expertise is not transferred only at the explicit level (e.g., presentations within the department, documentation of knowledge in the lessons learnt database), but also at the implicit level (expertise transfer to Mr. E.).

4 Evaluation – K.exchange to Date

The evaluation presented here is, by now, based on the analysis of 43 feedback questionnaires, returned by participants of the knowledge exchange process at Airbus after closure of the operations [including knowledge providers and knowledge receivers; for more details cf. Weber et al. 2007].

As presented in Figure 4, a huge majority of the participants confirmed the efficiency of the knowledge exchange process: 100 per cent of the knowledge providers agreed mostly or completely that the most important areas of expertise were included in the action plan and 77 per cent of the knowledge receivers agreed mostly or completely that they received the knowledge they expected.

From this high level of agreement we may conclude that, thanks to the guided questions of the facilitator/process coordinator, more knowledge areas were covered than it would have been the case without the systematic knowledge exchange approach. The fact that less knowledge receivers than knowledge givers confirmed the efficiency of K.exchange can partially be explained by the residual uncertainty that people feel when they are facing new, challenging positions.

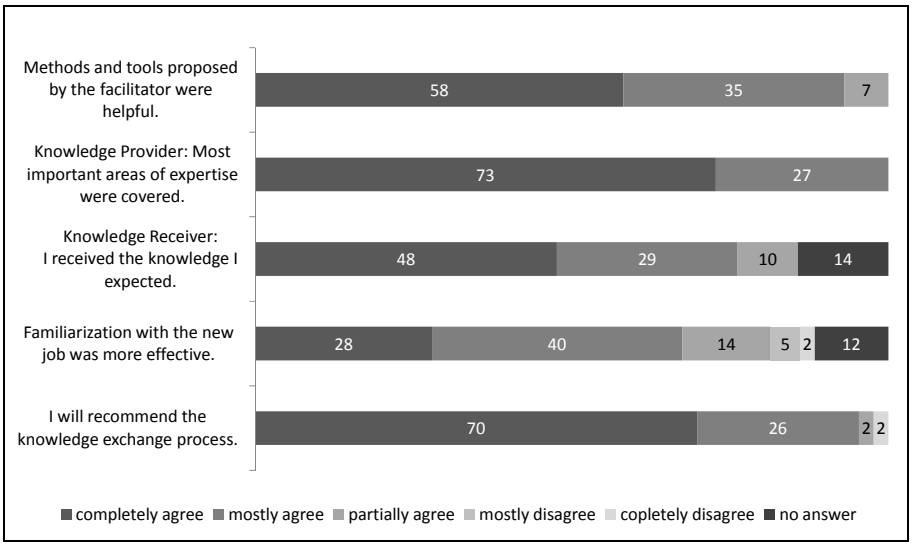

Figure 4: Evaluation of the Knowledge Exchange Process

Moreover, there was a large agreement that the introduction to the new job or position was very effective due to the knowledge exchange process, confirmed by 68 per cent of the participants, whereas 14 per cent partially agreed and only 7 per cent disagreed. Additionally, qualitative statements from the participants revealed, for instance, a reduction of the introduction time to the new job by 35 per cent as well as a personal benefit of 100 per cent.

The systematic knowledge exchange process presented here found wide acceptance among the participants. This is indicated by the fact that 96 per cent of them mostly or completely agreed that they will recommend the approach to other colleagues. When asked to describe the knowledge exchange process in one sentence, participants expressed more business benefits as the most compelling reason to a process implementation, for instance:

- “the knowledge exchange process should be obligatory whenever an expert or manager is going to abandon his position”;
- “knowledge exchange retains know-how and ensures a smooth start for the successor”;
- “before, I could not imagine what knowledge exchange means and now I am positively surprised at the structured approach and the achieved results”;
- “a very useful approach for handing over a complex task in short time to a successor – saves time on both sides”;
- “knowledge exchange should be promoted better within the company. Before I was asked to participate, I did not even know that there is a knowledge management tool which is that efficient”.

When asked to name the biggest benefit of the knowledge exchange process, the participants appreciated, among other things, the transfer of social interfaces:

- “the information about the working environment was vitally important”;
- “getting to know relevant persons, that is to say the personal contact, is more important than anything else”;
- “the exchange of personal experiences helped me to fill my new position”.

These statements not only re-emphasize that knowledge about internal and external organizational networks looms large to employees in engineering companies, but also confirm that the knowledge exchange process is appropriate to transfer both the experts’ technical knowledge and the experience-based knowledge about social networks.

Besides some smaller critiques that were mainly based on individual situations, several participants criticized that the knowledge exchange approach had been started to late. This could be identified as the main factor for future improvement. It also emphasizes again the need of a proactive identification process of leaving/moving experts and managers supported by HR management.

5 Summary and Outlook

To date, the knowledge exchange approach presented here has been successfully performed at Airbus and other companies in more than 100 cases. The process is characterized by its flexibility which is unmatched by any other knowledge transfer approach.

Thanks to the system’s inherent flexibility, the process can be adapted to the individual situation to enable a successful knowledge transfer. Other main factors for a successful knowledge exchange are:

- consistent consideration of the individual needs of the people involved,
- focus on interaction-oriented knowledge transfer methods, and
- organizational integration by means of the transfer network, a transparent identification process and feedback loops.

The interaction with the knowledge provider allows the knowledge receiver to understand the context in which the experience was gained, and thus, classifies the experience and attribute meaning to it. In this step, the facilitator and process coordinator plays an important role by analysing the individual situation during the analysis, minimising any factors that potentially disturb the transfer process, and creating supportive conditions.

The experiences described in this case study can be summarized in a clear recommendation for any organization that intents to embark on a KM initiative: Before you start any other KM project, implement a knowledge exchange process in your organization – it will provide the fastest return on investment of all KM solutions!

To prevent loosing crucial knowledge, the participation in a systematic knowledge exchange should be mandatory, especially for managers and skilled experts who are going to abandon their position. In terms of other highly qualified employees, the decision whether to carry out a knowledge exchange process or not can be made from

case to case. It is helpful, to set up a clear policy about mandatory participation in knowledge exchange processes or individual decisions dependent on specific management, functional or technical positions.

Over the next years, the demand for systematic knowledge exchange will increase even more with the retirement of skilled experts, experienced engineers, managers and other highly qualified employees of the baby boomer generation. With the upcoming demographic changes, extensions for a better anticipation of inter-generative knowledge transfer will be necessary as well. A third development axes is the combination of knowledge exchange with our approach for knowledge networks or communities of practice (CoP), which has already been applied for facilitating group learning between different Aircraft programmes and between experienced and less experienced engineers.

Our approach for systematic knowledge exchange presented here has already received much praise both from management and from employees. In 2006, the initiative was recognized with an "Airbus Award for Excellence" from the company internal recognition scheme in Airbus France and Airbus Germany.

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