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Knowledge Communication Problems between Experts and Managers

An Analysis of Knowledge Transfer in Decision Processes

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ABSTRACT

This article proposes a communication perspective on the problem of knowledge transfer between experts and managers in organizational decision making processes. We outline why this perspective is important and we show where and when knowledge communication matters. After an overview of typical knowledge communication situations in management, we define knowledge communication and differentiate it from other types of professional communication. We do so by showing that what is communicated differs from regular communication contexts, as well as how one communicates. We then review 26 existing theoretical concepts that describe barriers to knowledge communication. We relate these constructs to results obtained from 7 focus groups with engineers and IT experts and 30 interviews with managers and consultants. Based on our findings, we categorize typical knowledge communication problems between experts and managers into five groups: expert-caused, manager-caused, reciprocal mistakes, situation-caused, and organizational barriers. As a synthesis, we propose a structural model of the drivers of knowledge communication quality. The article closes with implications for management and outlines open issues and future research questions.

1. INTRODUCTION: THE IMPORTANCE OF KNOWLEDGE COMMUNICATION IN MANAGEMENT

Communicating professional knowledge is a key activity for today's specialized workforce. The efficient and effective transfer of experiences, insights, and know-how among different experts and decision makers is a prerequisite for high-quality decision making and co-ordinated, organizational action [Straub & Karahanna, 1998]. Situations of such deliberate (interfunctional) knowledge transfer through interpersonal communication or group conversations [Gratton & Goshal, 2002] can be found in many business constellations, as the following typical **examples** illustrate: Technology experts present their evaluation of a new technology to management in order to jointly devise a new production strategy [McDermott, 1999]. Engineers who have discovered how to master a difficult manufacturing process need to convey their methods to engineers and managers in other business units [Szulanski, 1996, 1999]. Legal experts brief a management team on the implications of new regulations on their business model [Wilmotte & Morgan, 1984]. Project leaders need to present their results to the upper management and share their experiences of past projects in order to assess the potential of new project candidates [Schindler & Eppler, 2003]. Scientists who work as drug developers present new avenues for future products that business unit managers must assess. Market researchers present their statistical analyses of recent consumer surveys to the head of marketing [Boland et al., 2001]. Strategy consultants present the findings of their strategic company assessment to the board of directors in order to improve strategic planning [Creplet et al., 2001]. These are just a few examples that illustrate the importance of knowledge communication in management. The list is extended in table 1. It outlines typical management domains in which the sharing of specialist

knowledge is critical to decision making. Table 1 not only compiles decision makers and their needs and questions, but it also lists corresponding experts and their decision-relevant knowledge.

Table 1: Examples of knowledge communication in management

MANAGEMENT DOMAIN	DECISION MAKER & KNOWLEDGE NEEDS	SPECIALISTS & TASKS	TYPE OF KNOWLEDGE that is transferred
INFORMATION TECHNOLOGY (IT)	CIO (chief information officer): which system should we buy?	IT Analysts: Evaluate software & suppliers, recommend purchase	Technology & market know-how, evaluation and analysis results
FINANCE	CFO (chief financial officer): where should we invest our cash base?	Financial Analysts: evaluate investment opportunities, recommend shares, bonds, etc.	Financial know-how, forecasts, company analyses, know-who (knowledge about people)
PURCHASING	Head of Purchasing: which supplier is best for us?	Purchasing Analysts: evaluate potential suppliers, recommend supplier base	Market knowledge, experience with suppliers, knowledge about contractual terms
PLANNING	CEO (chief executive officer): what is going to happen in the market and how should we internally react to it?	Strategic Planners: analyze possible developments and scenarios and their impact on the company. Present ramifications.	Know-what-if: possible future states and feasible responses, scenario-building know-how
M & A	CEO : Which companies are potential acquisition candidates?	Business Analysts: Screen potential candidates, calculate company value; perform due diligence	Valuation results, market knowledge, analysis results
R & D	Head of R&D (research and development): Which technologies must we incorporate, which projects must we prioritize?	Product Development Engineer: technology monitoring, testing & evaluation, recommendation on new projects	Technology know-how, knowledge about pros and cons of certain technologies, risks and benefits associated with certain technologies
MARKETING	Product Manager: How is my product perceived by the market?	Market Research Analysts: identify consumer preferences and communicate consequences	Customer knowledge, methodological know-how, market insights
PRODUCTION	Head of Production : How can we assure consistent quality in our production?	assembly line engineers: Identify quality problem root causes and countermeasures	Production experience, problem analyses, quality management know-how
LEGAL / REGULATORY AFFAIRS / COMPLIANCE	CEO / Entrepreneur: How do I comply with legal requirements? What are my rights/obligations/options?	Lawyers: clarify application of law to a case, recommend argumentation and implementation internally	Legal knowledge, compliance knowledge
HUMAN RESOURCES	Head of HR: what is the potential of this employee?	Recruiting Specialists / Psychologists: evaluate candidates with tests & interviews	Knowledge about people and their abilities and personalities
RISK MANAGEMENT	Risk Manager: How do I quantify these risks?	Underwriters/ Actuaries: analyzes and calculates risk scenarios and risk probabilities and resulting margins	Modeling know-how, industry knowledge, risk policy know-how
LEADERSHIP	New team leader: How should I lead my team?	Training Professional: convey leadership skills and insights	Leadership know-how, experiences, methods, etc.
STRATEGY	CEO: She needs to know whether to use existing technology for a new market or remain with current approaches.	Technology Consultants: conducts feasibility study and recommends strategy	Industry knowledge, market knowledge, competitor knowledge
SALES	Head of Sales: He wants to know more about his staff of sales professionals: who are they, what makes them tick, how should they be managed?	HR specialists: conveys her know- who to the sales manager: what background do his sales representatives have, what motivates them, how do they work, whom do they know etc.	Knowledge about people, experience with staff.

What these diverse situations all have in common is the problem of *knowledge asymmetry* [Sharma, 1997] that has to be resolved through interpersonal communication. While the manager typically has the authority to make strategic or tactical decisions, he or she often lacks the specialized expertise required to make an informed decision on a complex issue (Watson, 2004). This *authority-expertise chasm* calls for knowledge communication. Because of the wide scope of decisions that need to be made, a manager frequently has to delegate the decision preparation

to experts who – based on their professional training and previous experience – can analyze complex situations or technological options in a more reliable manner. The results of such analyses then need to be communicated back to the manager, often under considerable time constraints. The knowledge communication challenge, however, begins long before that, at the time when the manager has to convey his or her knowledge needs and decision constraints to the experts in order to delegate the analysis task effectively. These and other problems will be discussed in the subsequent sections. Before, however, we briefly define the notion of knowledge communication more explicitly and distinguish it from other forms of communication.

2. THE CONCEPT OF KNOWLEDGE COMMUNICATION

Based on the reasoning described in the previous section, we **define** knowledge communication as the (deliberate) activity of interactively conveying and co-constructing insights, assessments, experiences, or skills through verbal and non-verbal means. Knowledge communication has taken place when an insight, experience or skill has been successfully reconstructed by an individual because of the communicative actions of another. Knowledge communication thus designates the successful transfer of know-how (e.g., how to accomplish a task), know-why (e.g., the cause-effect relationships of a complex phenomenon), know-what (e.g., the results of a test), and know-who (e.g., the experiences with others) through face-to-face (co-located) or media-based (virtual) interactions. This type of knowledge communication can take place synchronously or asynchronously¹. The first mode of communication refers to (often face to face) real-time interactions, while the latter designates delayed (usually media-based) interactions. We use the term *knowledge dialogues* for the first type of (synchronous) knowledge communication, stressing the interactive and collaborative style of knowledge exchange in this communication mode (see Isaacs, 1997). For the later type of (asynchronous) knowledge communication, we refer to the concept of *knowledge media* (see Eppler et al., 1999), Knowledge media enable knowledge transfer through technology based communication, collaboration, e-learning, retrieval and archiving services.

In this understanding, knowledge communication is *more* than communicating information (e.g., facts, figures, events, situations, developments, etc.) or emotions (e.g., fears, hopes, reservations, commitment) because it requires conveying context, background, and basic assumptions. It requires the communication of personal insights and experiences. Communicating insights requires the elicitation of one's rationale and reasoning (i.e., one's argumentation structure), of one's perspective, values, ratings and priorities, and of one's hunches and intuition. At times it may even be necessary to present an overview of the expert's relevant skills, previous

¹ Both modes can be used in one-to-one or one-to-many contexts. Both modes can rely on speech, text, graphics, and other means of communication (i.e., verbal and non-verbal).

professional experiences and credentials (Lunce et al., 1993) in order to build trust and enable an adequate atmosphere for effective knowledge transfer. Thus, in addition to pure information (and at times emotion), a myriad of other (contextual) indicators need to be provided in order to transfer knowledge. These indicators help the person who requires insights from another to understand the other's perspective, to re-construct the other's insights correctly, and to connect them to one's own prior knowledge.

Still, knowledge communication does not only differ in terms of *what* is communicated (knowledge in context rather than isolated data or information²), but also *how* one communicates. The transfer of information can often be successful without additional effort beyond an ordinary, every day communication style. Communicating expertise-based, complex insights, by contrast, calls for didactic tricks and at times sophisticated indirect speech acts and visualization means that help the other side to become actively involved in the communication and engage in a collaborative, goal-directed sense making process – a prerequisite for the construction of new knowledge (see Weick, 1995). The process of knowledge communication hence requires more reciprocal interaction between decision makers and experts because both sides only have a fragmented understanding of an issue and consequently can only gain a complete comprehension by iteratively aligning their mental models. All of this means that when we communicate knowledge, we are still communicating information and emotions, but we also create a specific type of context so that this information can be used to re-construct insights, create new perspectives, or acquire new skills.

This (interpersonal) communication perspective on knowledge transfer has already been emphasized by other researchers – who also explicitly label this view as ‘knowledge communication’³ – (Scarborough, 1995, p. 997; Antonelli, 2000; Harada, 2003; Reiserer et al., 2002) and by several practitioners (e.g., Mitchell, 2001; Watson, 2004). Nevertheless, these authors have often treated knowledge communication as a kind of black box that is described only in broad terms and general traits, such as the major communication goals or steps. By examining the communication problems which often impede knowledge transfer in detail, we can look into this black box and propose ways of improving knowledge communication, especially among experts and managers.

² Our distinction between data, information, and knowledge follows the main stream conception found in current literature (see for example Davenport & Prusak, 1998). We view data as isolated recordings that are often generated automatically and cannot be directly used to answer questions. Information is connected, condensed or generally processed data that allows an individual to answer questions. Knowledge is what enables an individual to ask relevant questions (Newman and Newman, 1985, p. 499). It refers to the capability of an individual to solve problems (Probst et al., 1999). Information only becomes knowledge, if a person interprets that information correctly, connects that piece of information with his or her prior knowledge, and can apply it to problems or decisions (see also Alavi & Leidner, 2001)

³ Many researchers, however, neglect the issue of communication to a great extent. In a review of knowledge management literature by Scarborough and Swan (2001) communication does not surface as a core issue in the knowledge management literature from 1993 to 1998.

3. PROBLEMS IN THE COMMUNICATION OF KNOWLEDGE AMONG EXPERTS AND MANAGERS

In order to better understand the problems that can impede the effective transfer of decision-relevant knowledge from experts to managers and from managers to experts, we will review relevant constructs and prior findings from various applied social sciences, as there are in fact numerous concepts that describe issues related to sub-optimal knowledge transfer. These concepts regard topics such as interdepartmental knowledge transfer, professional communication, decision making, communication technology, or the nature of expert knowledge. By screening these disciplines and topic areas, we can establish a first overview of possible knowledge communication problems and we can create a systematic terminology to speak more explicitly (and consistently) about knowledge communication barriers.

3.1 Existing constructs that explain knowledge communication problems

Potential barriers to knowledge transfer between experts and managers that have already been identified and studied are summarized in table 2. There are three main criteria for including concepts in this table: first, the concept has to be closely related to problems of interpersonal, professional knowledge transfer⁴; second the concept has to describe a problem of major impact on the quality of knowledge communication (rare or very specific issues are not included); third, the concept has to be influential (e.g., it should have triggered a significant response in the literature). The resulting list in table 2 first includes ‘umbrella’ concepts that designate a group of closely related problems, such as cognitive biases, decision making problems, argumentation fallacies, communication biases, or defensive routines, and then concepts that label individual problems, such as the not-invented here syndrome or the ASK problem.

⁴ The concept does not have to originate in the context of interpersonal communication research, but its application to it must be obvious and fruitful, as in the example of the ASK problem. The ASK problem was first discussed in the information retrieval community, but it has ramifications for interpersonal knowledge communication as well.

Table 2 : Key research concepts that illustrate social and cognitive knowledge communication barriers

Key Concept / Knowledge Communication Barrier	Description	References
Cognitive biases (confirmation, availability, recency, dichotomized reasoning, sunk costs/escalating commitment, framing, anchoring, representativeness, etc.)	Knowledge may not be correctly interpreted, accepted or used due to biases in one's reasoning, such as listening only to those insights that confirm one's prior opinion.	Tversky & Kahnemann, 1974
Decision problems such as plunging In, Shooting from the hip, poor feedback, taking shortcuts, frame blindness etc.	The decision maker may for example believe that he can make a complex decision right away without looking further at the provided analysis.	Russo & Shoemaker, 1989
Communication biases (audience tuning, misattribution bias, saying-is-believing, shared reality)	The knowledge is inadvertently manipulated through communication itself: <i>- Audience Tuning:</i> Communicators spontaneously tune their messages to: –the personal characteristics of the audience –the situational factors <i>-Misattribution Bias:</i> Communicators tend to consider their audience-tuned messages to be about the topic of the message rather than about the audience <i>- Saying-Is-Believing Effect:</i> Autopersuasion has stronger effects because one does not activate regular mechanisms of critical reflection. <i>- Shared Reality:</i> You consider your audience-tuned message to provide objective, accurate information on the message topic because it was shared with others.	Higgins, 1999
Argumentation fallacies (begging the question, over-generalizing, personal attacks, defective testimony, problematic premise, slippery slope, red herring, etc.)	In demonstrating one's ideas and insights, people fall into argumentative traps, such as begging the question (circular reasoning), over-generalizing, appealing to false majorities or false expertise, reasoning ad consequentiam (what shouldn't be true, can't be true) or reacting with direct attacks at a person (at hominem) rather than at a knowledge claim.	Van Eemeren, 1992
Defensive routines (skilled incompetence, learned helplessness, easing-in, etc.)	New knowledge is sometimes not accepted (or provided) due to mechanisms or habits that prevent the identification and acceptance of one's own ignorance. This may lead to a reduced effort to understand complex issues (learned helplessness) .	Argyris, 1986, 1990
Knowledge disavowal	A number of factors have been found which limit information use in organizations, such as not spending enough time collecting advice, refusal to share, fear of exposure, etc. Knowledge disavowal occurs when reliable and relevant information is not shared among decision makers.	Zaltman, 1983; Deshpande and Kohli, 1989
Knowledge sharing hostility	Knowledge communication fails because the 'knowledge giver's are reluctant to share their insights due to micropolitics, strenuous relationships, or due to fear.	Husted & Michailova, 2002
Micropolitics of knowledge	The 'knowledge claims' of an expert are discredited by the decision makers due to their differing (hidden) agenda, because of a coalition of people with an alternative view, or due to the expert's lack of formal authority.	Lazega, 1992
Internal knowledge stickiness	Knowledge can sometimes not be transferred because of arduous relationships, or casual ambiguities regarding the knowledge or because of the lack of absorptive capacity of the knowledge receivers.	Szulanski, 1996, 1999
Groupthink	A (management) team may not truly listen to the input of an expert because of the team's group coherence and group dynamics sometimes block outside advice and feel	Janis, 1982

	omniscient.	
Information overload	An individual is sometimes not able to integrate new information into the decision making process because too much complex information has to be interpreted too quickly.	O'Reilly, 1980, Eppler & Mengis, 2004
Self/Other effect	Individuals tend to discount advice and favor their own opinion.	Yaniv & Kleinberger, 2000
Knowing-Doing gap / Smart talk trap	Sometimes organization know where a problem resides and how to tackle it, but do not move from knowledge to action (due to unhealthy internal competition or lacking follow-up).	Pfeffer & Sutton, 2000
Absorptive capacity	Limited ability of decision makers to grasp the knowledge of the expert based on a lack of prior knowledge.	Bower and Hilgard, 1981; Cohen & Levinthal, 1990
Paradox of expertise	Experts sometimes find it difficult to articulate their knowledge or rephrase their insights in a way that a non-experts can understand. Sometimes experts indicate other rules than they actually apply.	Johnson, 1983
Ingroup outgroup behavior	We tend to interact more with likewise groups than with others thus reducing our changes to acquire radically new knowledge.	Blau, 1977
Task closure	In our communication ,we may choose to use a one way communication medium because it permits us to close an open task without having to have a conversation. Thus leaner communication channels are used than may be necessary. In other words: We tend to want to close a communication process in order to complete an open task.	Straub & Karahanna, 1998; Meyer, 1962
Set-up to fail syndrome	Managers are projecting their initial expectation of an expert's likely performance unto him/her, leading to the self-fulfilling prophecy of (at times) lower performance. This is aggravated by de-motivating feedback to the expert.	Manzoni and Barsoux, 2002
ASK problem	Anomalous State of Knowledge: when a decision maker does not have the knowledge base to really know what to ask for. People need to know quite a bit about a topic to be able to ask or search for relevant information.	Belkin, 1980 ; Chen et al., 1992
Not-Invented here syndrome	Knowledge from others is sometimes rejected because it originated elsewhere.	Katz & Allen, 1982
False consensus effect	We assume others see situations as we do, and fail to revise our framing.	Manzoni & Barsoux, 2002
Inert knowledge	The knowledge that the decision maker has acquired from the expert does not come to mind when it is needed or useful for decision making or actions. The transferred knowledge is stuck in the situation where it has been acquired.	Whitehead, 1929
Hidden profile problem	You don't know the other's background, e.g. what they know and could contribute. The only knowledge that is consequently shared is what is expected by everyone.	Stasser 1992; Stasser and Stewart, 1992
Common knowledge effect	The tendency of a group to focus merely on commonly shared (rather than unique) pieces of information.	Gigone & Hastie, 1993
Lack of common ground	Common ground refers to the manager's and expert's assumptions about their shared background beliefs about the world. If those assumptions are wrong or inconsistent communication becomes more difficult.	Clark and Schäfer, 1989, Olson & Olson, 2000
Cassandra syndrome	The decision makers do not give sufficient weight or attention to an expert's warning because they face many other important problems. Only when the situation has deteriorated dramatically do they start taking the expert's advice.	Mikalachki, 1983

The problems listed in table 2 are neither mutually exclusive nor collectively exhaustive. Nevertheless, table one summarizes many of the key pitfalls in communicating knowledge. It is

in the nature of the phenomenon that these problems are not isolated, but that they interact in many, sometimes unpredictable ways.

3.2 Knowledge communication problem categories in overview

Based on the concepts from table 2, and based on 7 focus groups⁵ and 10 personal interviews with engineers that frequently collaborate with managers in their companies, as well as interviews with 20 IT managers⁶ who regularly interact with experts for their decision making, we distinguish among **five types of knowledge communication problems**. They are briefly summarized below before we give further examples of each type of problem, as they were told to us by experts and managers.

A first type of knowledge communication problems are *expert-caused* difficulties. These mistakes make it cumbersome for the decision maker to grasp the insights of a specialist. This type of problem also includes issues that make it difficult for the manager to explain his or her own constraints and priorities to experts. Examples of this kind of problem are the use of overly technical jargon, not relating the insights to the manager's situation, starting with details before an overview is given or a lacking interest of the expert in related (but relevant) issues. From the list provided in table 2 knowledge-sharing hostility and the paradox of expertise would clearly belong to this category.

A second category of knowledge communication challenges are *manager-caused* problems that leave it unclear to the expert what the manager actually expects from him/her, or that make it difficult for the expert to convey what he or she knows (because of inadequate attention). Examples of such manager-induced communication problems abound: A manager may be reluctant to discuss detail problems which have major effects on an issue; he or she may lack concentration and pay too little attention. A manager may lack a basic level of technical know-how thus making knowledge transfer difficult. From the list in table 2, the decision problems, the ASK problem, the Cassandra syndrome or the inert knowledge problem are typical examples of this group.

⁵ Each focus group lasted for approximately one hour and consisted of 8-20 participants. The focus group were conducted in 2002 and 2003 in Switzerland with engineers and IT specialists from various companies. Focus group facilitation and documentation was provided by the research team. The topic of the focus group discussion was "communication problems among engineers and managers".

⁶ Each interview lasted between 30 minutes to two hours. Interviewees were mostly senior IT managers or chief information officers of medium-sized and large Swiss companies, as well as select line managers with considerable experience. The main topic of the interviews was "problems in the knowledge communication with specialists." For additional information, we refer to the appendix at the end of the article.

A third type of knowledge communication problems is caused by the *mutual behavior* of experts and managers, including their experiences or attitudes, e.g., reciprocal negative stereotypes or a neglecting to check for a common understanding of an issue. Examples from the list of concepts that belong to this group are lacking feedback on both sides, the set-up to fail syndrome, groupthink, or ingroup outgroup behavior.

Fourth, we see problems caused by the *interaction situation* itself, such as extreme time constraints, inadequate communication infrastructure, distractions, dysfunctional interventions from others, etc. The problem of information overload in table 2 can arise due to the time constraints in a communication situation. But also the hidden profile problem can be due to the communicative situation, where the background of the participants is not fully revealed or discussed at the beginning of a manager-expert interaction.

As a fifth and final category of knowledge communication problems, we group issues that are caused indirectly by the *overall organizational context* of managers and experts, such as their organizational constraints, their differing tasks, priorities and interests. The ‘micropolitics of knowledge’ concept listed in table 2 would be an example of the (negative) impact of the organizational context on the transfer of knowledge.

Having briefly outlined the five main drivers of communication problems that impede effective knowledge transfer between experts and managers, we now look at each problem group individually. The problems listed in each category are mainly based on the aforementioned focus groups and interviews. Whenever possible, they are related to the constructs or concepts compiled and explained in table 2.

3.3 Expert-caused knowledge communication problems

What frustrates me most in the collaboration with our experts is their disregard of context, of the big picture or of how others will use their results.

Head of truck development of an international automobile company (with a management background)

The relationship between specialists or experts⁷ and managers is not always an easy one. As various documented institutional case studies (from the NASA challenger catastrophe [Vaughan 1997] to the dotcom bubble) show, successful communication between engineers and managers, analysts and investors, or consultants and entrepreneurs are crucial in many ways. Seldom is it a collaboration that can be characterized as harmonious, routine and void of conflict. In fact, experts' and managers' interests, priorities, and communication styles often collide when the two groups interact. Managers are quick to point out the shortcomings of experts when it comes to communicating their findings adequately. Specialists, such as engineers, themselves agree that they do not always pay enough attention to the way that they present their results. Their focus is on the production of results and not on their communication. Consequently, the impact of their ideas and insights is sometimes not as big as it could be. In this section, we thus focus on knowledge communication problems caused by experts. These problems were mentioned by experts themselves (e.g., by engineers, IT specialists, analysts, etc.) as well as by managers (e.g., CIOs, heads of marketing, entrepreneurs, R&D and technology managers etc.) in our focus groups and interviews. Whenever possible, we relate the problems that were voiced by managers or experts to the theoretical concepts introduced in the previous section. Although we begin by describing the problems that result from specific expert traits and behavior patterns, these issues are not the sole reasons why knowledge communication fails, as the subsequent sections will show.⁸

Experts can impede the effective transfer of decision-relevant knowledge to and from management in many ways and at many stages of the knowledge transfer (from the initial briefing by management to the implementation of an expert recommendation) . They can do so intentionally (as in the case of knowledge sharing hostility) or without even being aware of their obstruction (as in audience tuning, see table 2). Many of the problems mentioned in the focus groups and interviews that we conducted can be related to three specific traits of expert behavior: first, *overloading* the communication with details or not giving it an adequate *structure* to absorb the complexity of an issue; second, not *adapting* the communication to the needs and prior knowledge of managers or adapting it too much to the management (e.g., saying what management wants to hear); a third problem cluster relates to an inadequate communication *style* of the expert.

⁷ We use the terms experts and specialists interchangeably in this context and understand them broadly rather than in a narrow sense. In this understanding, experts are those who possess and utilize relevant expertise in problem solving (Lunce et al., 1993). According to cognitive psychologist Kellog, 1997, (who bases his findings on Simon, Anderson, and other eminent cognitive science colleagues) experts have engaged in a *deliberate practice* in their field of expertise for a number of years (usually more than ten) with consistent high quality results.

⁸ The problem can therefore not be resolved, as some managers may think, by simply sending engineers, analysts, or other types of specialists to a communication training.

The first problem cluster has many variations. All of them are related to the (in)adequate *reduction of complexity*. If the problem is intentionally caused by the expert, he or she may not even try to make a complex issue accessible to management. An issue may be deliberately presented as something impenetrable and overly complex, so that the manager is less likely to ask the expert probing or critical questions and just accepts his or her advice. The expert may deliberately use technical terms, jargon, acronyms or difficult examples to achieve this objective. Some experts, however, simply forget to structure their insights in an accessible manner. They unintentionally drown the managers in a myriad of details on various abstraction levels and without adequate prioritization. They do not provide overviews, background⁹, summaries, ramifications or consequences of their analysis. The managers consequently struggle to create a coherent structure themselves, in order to make sense of the presented complexity. This problem is often aggravated by the fact that the expert's deficient structure or prioritization results in a sub-optimal allocation of knowledge sharing time (e.g., the expert runs out of time before the implications of his analysis can be discussed).

The second problem cluster is related to the first one, but goes beyond the reduction of complexity for management. This problem group, which can also be intentional or unintentional, refers to the inadequate *adaptation* of an expert's contribution to a managerial decision process. Adaptation in this sense refers to the expert's ability to relate his or her findings to the context of managers, that is to say to their goals, options, restrictions, to their prior knowledge and experience, and to their functional background. This implies that the expert has to take into account the manager's unique perspective, his or her prior projects, general priorities, and preconceived notions. Many times, however, the expert just focuses on the problem at hand and its drivers, and does not offer possible linkages to the manager's background or even to possible solutions. If experts do focus on a possible solution to a problem, they often only discuss the technical dimension of its feasibility and neglect other issues, such as timing, competition, and costs. This is due to the fact that experts approach an issue with a different mind-set than managers. While management's priorities may relate to budgeting, time-to-market or competitive advantage, specialists tend to focus on quality, risks, innovation and technology. Another related error refers to the fact that experts sometimes presuppose that the managers have technical knowledge to a degree that exceeds their actual technical know-how. Adaptation can also be exaggerated (as outlined in the 'audience tuning' effect in table 2). Sometimes experts may adapt their findings to a degree that changes the essence of their insights. They may say what managers want to hear or they may simply adapt their analysis to management's preferences, holding back their true beliefs for political or career reasons (this is over-adaptation

⁹ The opposite, too much background, can also bother managers, as the following quote by a marketing director of a financial information company shows: „These people [experts] start with Adam and Eve in paradise and work their lengthy way up to the current business situation. That is tiresome, especially when you're used to a headline type of news. “

is also related to the groupthink effect listed in table 2). This can lead to another important problem, namely that the expert gives advice in an area where he or she is not really qualified; the reason being that the expert tries to accommodate the managers' expectations.

The third major problem area refers to an inadequate *communication style* of an expert, be it in oral communication or in writing. Experts need to find the difficult balance between self-confidence (without being patronizing) and honesty (without being insecure). If an expert communicates in a self-serving manner, managers may feel aggressed and they may start to challenge the expertise just because of the expert's attitude. An insecure or overly self-critical communication style, in contrast, will hurt the expert's credibility. Style also relates to how an expert reacts to questions or concerns from management (e.g., aggressively and nervous versus in a calm and thoughtful manner). Other style issues concern the format of presentations and reports, as they often lack elegance or simply solid design, because of time constraints or lacking training or attention.

Summarizing these issues, we can conclude that experts struggle with three major issues when transferring their knowledge to managers: First, reducing or *synthesizing* their insights adequately, second, *adapting* these trimmed insights to the management context without distorting them, and third, *presenting* the compressed and adapted findings in a trust-building style and *reacting* adequately to management questions and feedback.

These issues are of course not independent of the behavior of the managers. The discussed problems are also the result of the experts' experiences with managers. The next section will consequently look at management's role in the knowledge transfer and how managers sometimes aggravate the described problems. Sometimes, however, managers have no way of influencing the experts on whom they depend, as the following quote by a department head of a large health care organization illustrates. Obviously, this manager has to depend on government specialists that she cannot influence. Her main problems with these experts relate to two issues discussed in this section: style and structure: „The documents originated by government institutions are often just horrible in terms of the style and the overall structure. At least summaries or a focus on the main five points would help. But I cannot dictate anything to them and they also work under time pressure, so what can I do?“ In section four, we will address this question of what to do as a manager to alleviate knowledge communication. In discussing this question, we will apparently have to distinguish between internal and external experts. First, however, we will look at further problems that can impede knowledge transfer.

3.4 Manager-caused knowledge communication problems

I think it's actually worse if a manager has a technical, but outdated, background. Not only do I have to inform him, but also re-educate him on the changes that have taken place since he left his engineering job.

Production engineer at a large industrial group

In this section, we list the problems that can affect knowledge transfer in the decision process negatively as far as they are caused directly or indirectly by managers or decision makers. We categorize the problems that we gathered during focus groups with engineers and managers, and during personal interviews in IT departments, consulting companies, and two market research firms, into four groups: problems caused by the inadequate expert *briefing* by the manager, problems caused by the manager's *time* constraints, problems caused by the manager's *prior knowledge* (or rather lack thereof), and problems due to the manager's personality or *attitude* towards the expert.

A prerequisite for effective knowledge transfer between expert and manager is the expert's understanding of the manager's situation (as outlined in the previous section). While this is in part the responsibility of the expert, he or she can not understand the manager's context without the manager's help. Very often, though, *managers do not inform experts well enough*. They do not inform them about their knowledge needs (i.e., what they need to know, why they need to know it, and how and when the results should be presented), their prior knowledge, their restrictions or their preferences (this is partly due to the ASK problem discussed in table 2). Managers frequently forget to specify the focus and scope of a required analysis. They fail to clearly articulate their decision criteria and their weightings. In briefing the expert, managers make many of the mistakes that are typically associated with experts: they use management acronyms that the expert doesn't understand (such as ROE, EVA, ROI, BSC, SWOT, DCF, etc.) they overload the expert with (at times irrelevant) details or they do not use their time well to give the expert a complete understanding of an assignment (e.g., delegating research or analysis tasks in an informal, ad-hoc style). During an assignment, they do not keep the experts informed of changing parameters in the environment or changing policies within the company. They do not provide much needed feedback on the experts' progress and whether the achieved results go in the right direction. Managers may also exert counterproductive pressure on experts to produce results very quickly – results that lead to clear alternatives or yes or no decisions, giving the

expert no possibility for differentiated recommendations (see the cognitive bias on dichotomized reasoning in table 2).¹⁰

A second problem cluster is caused by the manager's lack of relevant, up-to-date *domain knowledge*. As the quote that introduced this section illustrates, obsolete technological (or legal for that matter) know-how of a manager can become an obstacle to efficient knowledge transfer, especially if a manager does not accept the fact that his or her knowledge is outdated. Managers without a technical (legal, marketing, etc.) background may also overestimate their level of understanding of an expert domain, or they may simply not give enough *importance* to such domain knowledge. Managers thus frequently avoid detailed topic discussions, and instead focus on related but more familiar issues, such as budget implications or internal politics. Another strategy of managers who fear to admit a lack of knowledge is to attack the expert in an area that they understand well. All of this can lead to implicit misunderstandings and to the wrong communication and application of expert advice by managers. There is also a danger that a manager mistakes an expert's values and personal preferences for expertise or that he asks the wrong kinds of questions.

Part of the 'knowledge problem' described in the last paragraph is related to the manager's *attitude* and his or her willingness to admit 'not to know it all'. The manager's attitude and personality has further potentially negative effects on the knowledge communication with experts. The manager may have personal preferences which make him more or less open to suggestions from experts (see the cognitive confirmation bias in table 2). The preferences can relate to the domain that is discussed, but they can also relate to such arbitrary aspects as the format or sequence of the presented information. The manager's attitude is also critical for the relationship between the expert and the decision maker. If the manager does not take the expert seriously or value his know-how, genuine knowledge transfer will become very difficult, as the expert senses the manager's reservations and becomes de-motivated and cynical. This, of course, does not contribute to trust and relationship building, an important ingredient for sustainable collaboration between experts and managers (see the set-up-to-fail syndrome in table 2). An often heard problem in this context is the reluctance of many managers to listen to internal experts. This 'prophet' problem refers to the fact that many managers rather hire outside consultants as neutral experts than listen to the experts in their own company who may have more intimate knowledge of an issue (this is related to the Cassandra syndrome in table 2).

¹⁰ In his insightful book on information anxiety (Wurman, 2000, pp. 61-75) Richard Saul Wurman provides a list of managerial behavior archetypes related to giving and receiving instructions from collaborators. These (caricature-like) types can be applied to the manager-expert interaction, especially in the briefing stage. An example of such an instruction-giving archetype is the 'ping-ponger' who asks for information that is focused, but broad, creative, but factual, or advanced, but comprehensible. An example of a poor instruction receiver is the 'just give me the details' manager who always tries to second-guess the expert and does not really listen to what he or she has to say.

One of the most frequently heard problems that experts voice when asked about management's mistakes in knowledge communication relates to the adequate allocation and use of *time* for knowledge transfer. It seems that many managers dramatically underestimate the time required to gain a common understanding of an issue with experts. This at least, is what many experts have told us in several focus groups. In their opinion, the increased pressure to make decisions fast reduces the time allocated for communication and deliberation and this in turn dramatically lowers the quality of knowledge transfer and use. This is a problem, however, that seems difficult to resolve, as managers face many other tasks besides interacting with experts who help them to make decisions. But according to some experts that we have interviewed, the timing issue is not just about quantity, it is also about timing or rather time planning. Timing refers to correctly planning and sequencing periods of knowledge transfer. Many times, experts need to intervene on a moment's notice, so that thorough preparation is no longer possible. This can lead to faulty analyses or decision making that is based on preliminary results only.

Summarizing the knowledge transfer problems caused by managers, we can conclude that the difficulties already begin in the *briefing* stage, when managers articulate their knowledge needs. At a later stage of the collaboration, it is often management's *lack of knowledge or interest* in the expert domain that leads to problems (this is similar to the Cassandra syndrome described in table 2). This is aggravated by a management *attitude* or personality that does not value the experts' input or is afraid to admit ignorance. Adequate *timing* by the manager, finally, is a major challenge in the entire expert manager interaction process. The problems discussed so far can be clearly attributed to either experts or managers. This is not true for the problems that are described in the next section.

3.5 Knowledge communication problems caused by mismatched assumptions and actions

Managers and us just seem to have different priorities and sensibilities. We [engineers] look for quality and reliability, whereas they focus on time and money.

IT-specialist at a multinational financial services group

In this section, we discuss problems that arise out of the reciprocal behavior or lacking co-orientation (e.g., alignment of thoughts and actions, see McLeod & Chaffee, 1973) of experts and managers. While some similar problems have already been discussed in the previous two sections, this section stresses the fact that many knowledge transfer problems exist because the managers' and the experts' *assumptions* or *actions* are not explicitly aligned.

It seems that misunderstandings among experts and managers are often due to unarticulated, *implicit, but conflicting assumptions*. These assumptions relate to a variety of issues that are

relevant for the transfer of knowledge, such as the nature and importance of the problem that is discussed, the procedure and timing employed to discuss it, the understanding of the other's role (incl. strengths and weaknesses), expectations regarding the outcome, the existence of a consensus¹¹, or even assumptions regarding the objective of the communication itself. Still other implicit, but frequently diverging assumptions of managers and experts relate to the specific meanings of terms, categories¹², symbols or metaphors. Examples of misunderstandings of terms abound. We have encountered two particularly surprising ones in a diagnostics and in a consulting company: In the first case, the experts' understanding of 'customer focus' related to product durability and reliability, while the managers associated the term with service excellence and speedy complaints handling. Earlier in the same team, managers and engineers were unsure whether they were each talking about internal or external (or both) customers. In the second case, the misunderstood term was 'order management'. While the experts correctly interpreted the term as the process by which orders are captured, processed, and delivered, management thought the concept related to a pending outsourcing decision. This misunderstanding was discovered when the two groups categorized the same process differently, one as a core process, the other as a support process. Misunderstandings like these do not only relate to terms. They can also relate to the diverging or ambiguous use of simple symbols like arrows, as the following quote of an IT engineer illustrates: "[When explaining a concept to management] one easily takes a pen and starts to draw something on the whiteboard or on paper: boxes, circles, arrows and behind each symbol, there is a specific semantic [meaning]. The trouble is that this semantic is not standardized and so an arrow can have very different meanings." If these assumptions on symbol meanings are not made explicit, misunderstandings abound.

Another form of particularly harmful implicit assumptions are *stereotypes*. These can lead to biases in the communication process, for example when managers are viewed as purely political opportunists or experts as people who always overestimate the importance of their field. When these implicit assumptions collide because they have never been made exposed, discussed, and corrected, misunderstandings ensue.

Besides mismatched assumptions, knowledge communication frequently suffers from mismatched actions (as a result of a lack of common ground, see table 2). Such mismatched 'communicative' actions can relate to simple issues as *documenting* the outcomes of an interaction consistently (to avoid the knowing-doing gap discussed in table 2) or to more sophisticated actions, such as *changing the level of abstraction* at which an issue is discussed: While a manager may still be talking about the general problem context, the expert may already

¹¹ While a manager may think that an issue has been clarified by declaring it as less relevant, the expert may still disagree, but not voice his or her objections (see the groupthink and false consensus effect in table 2).

¹² It is an established finding of cognitive science that experts and novices in a particular domain, categorize issues quite differently (see for example Browne & Ramesh 2002).

react by describing a particular aspect of a sub-problem. This can lead to further misunderstandings or lost time. Valuable time can also be lost when the two sides do not agree on a *common time schedule* for their interaction. While the experts may act on the assumption that they have a full hour for the problem analysis, managers may want to move from analysis to preparing the decision after only twenty minutes of discussion. Time problems such as this one are partly due to the situation in which managers and experts interact (e.g., tightly scheduled meetings or workshops). Thus, the interaction situation itself can cause communication problems. These situational problems are examined in the next section.

3.6 Knowledge communication problems caused by the interaction situation

As an analyst and energy expert it's tough for me to inform managers or investors about a promising technology when they have just heard five such optimistic stories in the preceding expert presentations.

Financial analyst of an investment firm

Whereas the previous sections have focused on knowledge communication barriers that exist because of the *people* communicating, this section lists some of the *situational* factors that make knowledge transfer difficult. A communication situation can be characterized in terms of its *time (of the day)*, *duration*, *location* (or *medium*), and *immediate surrounding* (e.g., noise or interruptions that cause distractions). These factors can have significant negative effects on the knowledge transfer quality of managers and experts. The time of the day of the interaction, for example, can affect the performance of both managers and experts negatively if their meeting is scheduled at a sub-optimal moment. Sub-optimal moments can be directly after lunch, late in the afternoon, or just before other important meetings. The timing of a manager-expert interaction is also crucial because of halo-, anchoring-, or priming-effects (see the section on cognitive biases in table 2): If an expert makes his contribution to a group of managers who have just listened to an opposing view, the expert will have a more difficult time explaining his own point of view. In this sense, the success of an expert-manager interaction may be path-dependent, meaning that events shortly before the interaction (such as a negative experience of one of the managers) can influence its outcome. Problems may also arise because of the duration of an interaction, as the attention and concentration of meeting participants tends to decrease after a certain period of time. Another factor that is normally beyond the influence of the expert is the location of the interaction. If there is continuous distraction, noise, or an inadequate infrastructure, the expert's task of conveying what he or she knows can become difficult. This can be particularly true if the expert presents his findings over the phone or via video-conferencing, as he cannot be sure of the undivided attention of the managers participating in the meeting. Choosing the right time,

duration, medium or location is thus a crucial task that has to be achieved before the actual communication begins.

The communication problems discussed so far are not only caused by the immediate meeting or communication situation, but also by the overall organizational context in which the interaction takes place. Such organizational reasons for strenuous knowledge communication are examined in the last problem group.

3.7 Knowledge communication problems caused by the organizational context

As specialists, we find it frustrating that we're not informed when priorities or responsibilities change. Whether that's due to internal politics or external market changes, we need to be informed if the overall context of our assignment or even the people commissioning our work change.

IT specialist at a multinational bank.

The organizational context in which management-expert interactions take place can affect the quality of knowledge communication and thus the quality of the collaborative decision making. The organizational parameters of an expert manager interaction can in this sense 'overshadow' an entire problem-focused conversation among experts and managers and make it unproductive. In our interviews and focus groups with experts and managers three such organizational factors came up repeatedly: first, *conflicting interests* of specialists and experts based on their organizational situation, second, frequent *changes in interaction partners* because of re-organizations, and third, *pressure* from other groups in the organization on the two parties involved in knowledge communication.

If the interests of experts and managers who need to collaborate on a complex issue are not aligned, their communication style and knowledge transfer will inevitably be affected. Both managers and specialists will be less open, less motivated and more strategic in their sharing and acceptance of insights. Reasons for such diverging interests can be manifold. They may be due to alternative views on funding needs: While engineers or in-house scientists may stress the need for research, managers may stress the capital requirements of marketing. Thus, their two (*financial*) *interests* are opposed, as each priority is associated with funding requests for the respective *peer group*.¹³ Other diverging interests may relate to different sensibilities or *priorities*: Where managers may be keen on reducing costs and increasing speed, engineers may focus on quality and security (the NASA challenger case illustrates these at times diverging

¹³ In one case we encountered, a group of managers asked the specialists in an engineering department to share all their techniques and methods with them so that they could evaluate the transfer of the department to another country. Needless to say that the engineers were not as forthcoming as the managers had anticipated.

interests, see Vaughn, 1996). Another area of potential conflicts of interest among specialists and managers is *planning*: While managers may want to keep their options open and explore various routes simultaneously without clear decisions, experts need clear guidelines and committed resources. The conflict thus centres around *long-term considerations* (pursued by some experts) versus *short-term orientation* (sometimes pursued by managers). These problems of interest are often aggravated by the fact that the differing interests cannot be discussed openly, thus leading to misunderstandings and a lack of mutual trust (which is a key prerequisite for functioning knowledge transfer, see Szulanski, 1999).

A second organizational factor that can make knowledge transfer difficult are *reorganizations*, particularly reorganizations that lead to new responsibilities, new priorities, or new teams and thus *new expert-manager constellations* (see also the quote that introduced this section). While this may be beneficial in some cases (i.e., enabling a fresh start without a prior history of negative experiences), it usually involves various adjustment processes and ‘lost’ time in the communication, e.g., time to get to know the other person and his or her preferences, values, and assumptions. One expert (an analyst) we interviewed called this phase “expert calibration”. The problem of changing contexts is particularly frustrating for experts when they feel that they have not been kept ‘in the loop’, that is to say that they have not been informed by management about re-aligned priorities, new responsibilities, or new evidence. Because of this lack of top-down information, experts may have worked in a (later) irrelevant area.

A third and closely related reason for sub-optimal knowledge communication is *outside pressure*. As shown by Janis in his studies on groupthink (Janis, 1982), outside pressure can negatively affect the decision quality of a team. Under pressure from other parts of the organization, managers may allocate less time for expert consultation. The experts, in turn, may feel obliged to ‘tune’ their input towards the expected results (see the audience tuning effect listed as a communication bias in table 1). Outside pressure may also lead to a more hectic discussion and less objective deliberation in a team of experts and managers.

While these organizational factors cannot be directly influenced by the managers and experts who collaborate in a knowledge-intensive decision process, they can be aware of them and make them an explicit area of concern and discussion. This can help to pro-actively avoid effects such as mistrust, missing alignment, or groupthink.

3.8 The resulting model of knowledge communication quality

The previous sections on knowledge communication problems can now be summarized as a model that lists the problems and their impact on the drivers of knowledge communication quality, as well as the immediate and ultimate goals of knowledge communication. The model is depicted in the following diagram.

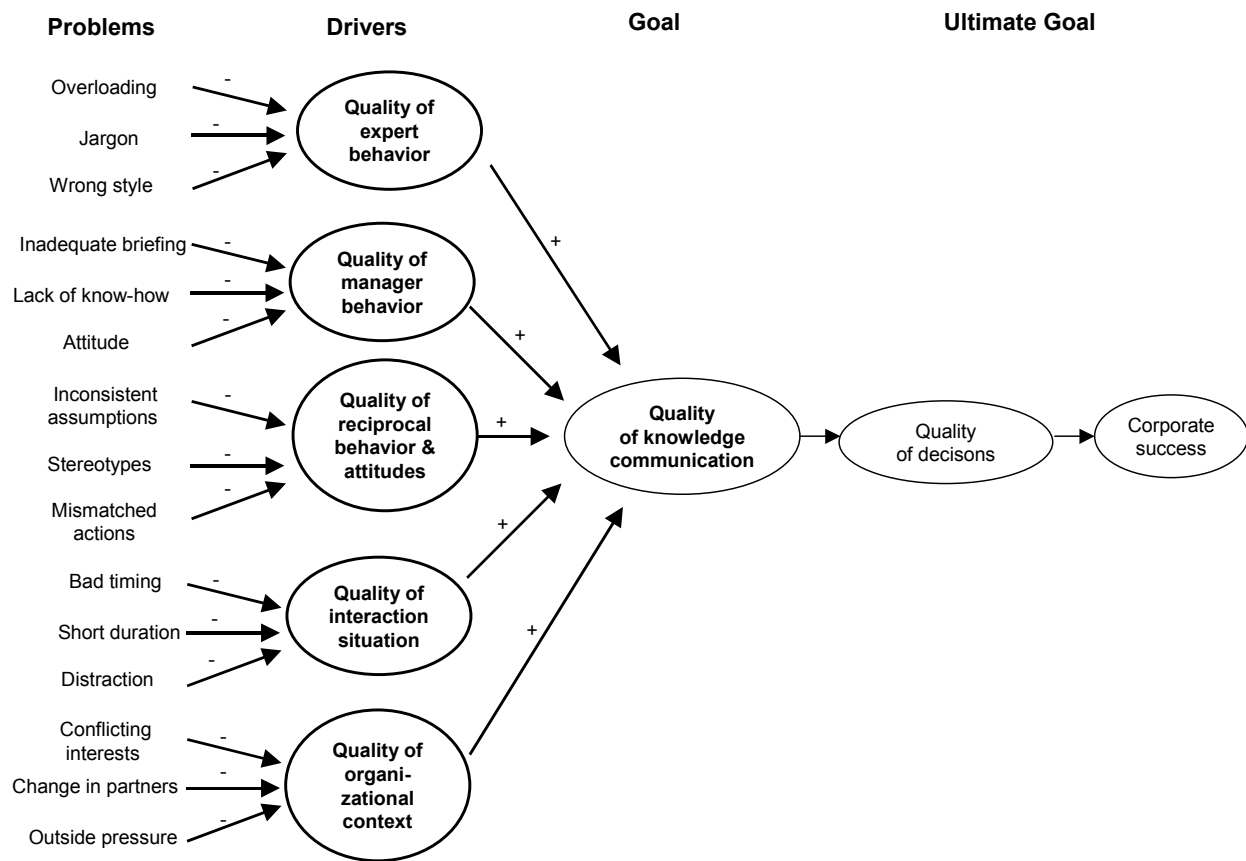


Figure 1: The structural model of knowledge communication problems

The model above illustrates that there are five main drivers for high quality knowledge communication among experts and managers. These five areas relate to the major causes of knowledge transfer problems, namely the expert, the manager, their interaction patterns, their communication situation, and their organizational context.¹⁴ The model further stipulates that a high quality of knowledge communication will ultimately lead to better decisions and greater corporate success. There is no single activity that can remove the problems at the left of this model. Rather a set of actions need to be taken to assure that the five qualities can be improved.

¹⁴ It goes without saying that the extent of knowledge communication problems also depends on the complexity of the knowledge that needs to be conveyed and applied to a decision making context.

4. CONCLUSION

In this paper we have introduced a communication perspective on the topic of knowledge transfer, particularly between domain experts and decision makers in management. We have shown in which management situations such knowledge transfer is important and how it can be characterized. We have described the differences among the communication of information and the communication of knowledge, outlining the demands on what is communicated (insights, experiences, know-how) and how one communicates (interactively, collaboratively, iteratively). The main contribution of this paper is a classification of knowledge communication problems among experts and managers based on the main cause of such problems, i.e., whether the interaction problems arise because of the expert's behavior, because of the manager, because of mutual (incompatible) attitudes or actions, because of the interaction setting, or problems due to organizational factors. The problems listed in these categories have been mentioned by specialists, such as engineers or analysts, or by managers, typically representatives of middle to upper management. However, our approach has been qualitative and it is based on a limited sample size in two cultural settings (Switzerland and Germany). Hence the generalizability of our problem taxonomy is still limited and needs to be further developed (for example through survey studies that question a greater number of both experts and managers). Nevertheless, this preliminary problem jostle has important implications for managers who wish to fully profit from the input of their experts. They need to develop the communication skills of their experts in order to avoid the problems listed as expert-caused. But they also need to be aware of their own shortcomings in such knowledge transfer situations. They need to make mutual assumptions, stereotypes and preferences explicit and find a common approach to knowledge transfer meetings. It is often their responsibility to find an optimal setting for transfer situations, so that the decision making process is not affected by sub-optimal parameters, be it on the interaction level or on the organizational level.

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Appendix: Information on the Focus Groups and Interviews

The following table lists the focus group details. The focus groups were all conducted prior to (in-house and public) seminars on professional communication. Participants were asked one main question by the facilitator: what do they, in their experience, see as the major problems in the communication between managers and experts (and can they give specific examples or anecdotes of each problem). Based on this question, the facilitator lead an approximately half hour long discussion among the experts and collected the various problems that were mentioned.

Group Number	Duration	Number of Participants	Date
Focus Group 1	40 minutes	17 (mostly telecom engineers)	6.12.02
Focus Goup 2	40 minutes	19 (mostly IT specialists)	23.1.03
Focus Goup 3	30 minutes	20 (mostly engineers)	24.3.03
Focus Goup 4	40 minutes	18 (mostly IT experts)	25.4.03
Focus Goup 5	40 minutes	13 (mostly automotive engineers)	24.5.03
Focus Goup 7	30 minutes	8 (marketing analysts)	5.6.03
Focus Goup 6	40 minutes	16 (mostly telecom and IT experts)	1.9.03

As far as the interviews are concerned, they were conducted with employees from two companies. In the first company, a multinational insurance company, we interviewed 20 IT managers and specialists in February 2004. In the second company, a small-sized consulting firm, we interviewed 10 (female and male) technology consultants (all engineers) in March 2004.