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# E-Collaboration within the dispersed sales force training process of multinational pharmaceutical companies

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## Abstract

*In this paper the authors propose an ICT architecture for the support of collaborative tasks within a dispersed sales force training process in multinational pharmaceutical companies. Four areas of collaboration are identified through case studies. Each of these areas comprises a certain number of collaborative tasks. The equivocality and complexity of these tasks have to be taken into account when considering ICT support. The authors used a task-media-fit-matrix to decide on and justify usage of certain information and communication technologies for the support of collaborative tasks. The task-media-fit-matrix, in our opinion, can help both practitioners and researchers in either justifying investments in e-collaboration tools or evaluating ICT architectures in the field of e-collaboration.*

## Introduction

In multinational pharmaceutical companies it is a big challenge to find the right balance between local responsiveness and global integration (Doz 1986, p. 191). Pharmaceutical companies based in Europe mainly follow a strategy of low economic integration and high levels of national responsiveness in terms of marketing (Rugman 2005, p. 114). The underlying framework of this paper is based on the so called transnational company, which simultaneously exploits two main sources of competitive advantage: local responsiveness in the form of affiliates and global integration (Holtbrügge and Berg 2004, p. 130; Prahalad and Doz 1987). In order to avoid “reinvention of the wheel” and information silos, affiliates have to collaborate closely and exchange information and knowledge. Collaboration between the headquarters and the affiliates has to be taken into account for building a durable competitive advantage (Bartlett and Ghoshal 1987, p. 7).

Sales representatives selling complex products (e.g., cancer drugs) or services are the most important interface between the company and the consumer (Cohen and Levinthal 1990, p. 132; Crosby et al. 1990, p. 68). Therefore, training plays an important role for sales personnel in order to stay up to date with the newest developments for their products or services. Furthermore, training has to ensure that key marketing messages are transferred to the customer. The stakeholders involved in the development and execution of sales force training are global and local marketing and sales management, product man-

agement, the training department, and to some degree the IT and human resources departments (Heidecke et al. 2007). All of the stakeholders must collaborate very closely to achieve sales force performance through higher levels of knowledge and more efficient sales techniques through training measures (Johnston and Marshall 2006, p. 255). Therefore, a collaborative team approach should be applied for better coordination of in-house activities and the demands of the sales force in the field (Belz 1999, p. 342). These virtual teams are called selling teams in this paper and can be compared to the knowledge teams (Mahnke et al. 2005, p. 106) which interact across subsidiary borders and positively influence the absorptive capacity of certain affiliates. Single tasks are accomplished by dynamic knowledge networks (Seufert et al. 2006) on an organizational and individual level.

During a bilateral research project with the Swiss multinational pharmaceutical company Roche (between October 2004 and April 2005), eight worldwide affiliates were investigated, and the results were documented and analyzed by applying case study research. As a result the authors developed a reference model for dispersed sales force training in multinational pharmaceutical companies (Heidecke et al. 2007). It is based upon the business engineering model (Österle and Blessing 2003) which comprises a strategic, process, and ICT level. The authors also developed a task-media-fit-matrix (TMF-matrix). This matrix was used to identify media for certain collaborative tasks.

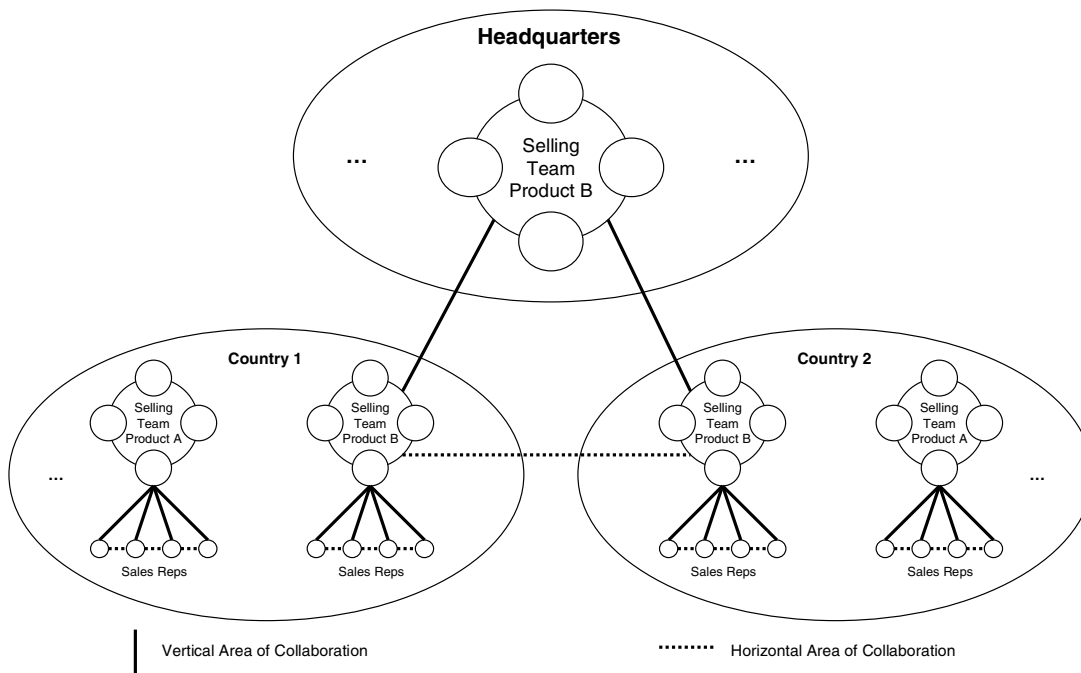
## State-of-the-Art and research objectives

E-Collaboration “is collaboration among individuals engaged in a common task using electronic technologies” (Kock et al. 2001, p. 1). In this paper we refer to this rather generic definition, as it does not only include computer-mediated, but also other forms of electronically supported communication (e.g., telephone). There are numerous publications emphasizing the importance of cross-location collaboration between virtual teams, the reasons for this demand, and the potential role of ICT in distributed collaboration (see Bell and Kozlowski 2002; Mayrhofer and Back 2004; Poltrock and Engelbeck 1999; Reichwald et al. 2000; Stoller-Schai 2003; Townsend et al. 1998; Wainhouse 2002). Taking the results of these research results into consideration we prepared and conducted our multi-case study. As a result of the cross-case analysis in (Heidecke et al. 2007), four areas of collaboration could be identified. They can be divided into vertical and horizontal collaboration on the one hand, and into collaboration on an organizational level and personal level on the other. **Fig. 1** depicts two vertical areas of collaboration (between global and local selling teams and between local selling teams and the sales representatives). In addition there is a horizontal area of collaboration between local selling teams from different affiliates (ideally speaking the same language). Secondly, another horizontal area of collaboration can be identified among the sales representatives selling the same product (or product line) in one affiliate. A selling team is a virtual team consisting of the different stakeholders involved in the sales force training process (marketing management, sales management, product management, training department/sales trainer, and to some degree the IT and human resources departments). Each of the stakeholders has to fulfil different responsibilities and tasks regarding the whole sales and marketing process (e.g., marketing planning and strategy, information dissemination). The sales force training process is a subprocess of the overall sales and marketing process. The different tasks of the training process are assigned to different members of the virtual selling teams (local and global). Most of the tasks can potentially be supported by ICT. However, ICT may be used inappropriately. This can lead to misinterpretation of information (Kock and Nosek 2005, p. 3) and subsequently to reduced productivity.

The media richness theory (Daft and Lengel 1984; Daft and Lengel 1986) proposes that usage of more suitable media for certain tasks will lead to reduction of uncertainty and equivocality<sup>1</sup> (Daft and Lengel 1986, p. 560). Thereby, quality of decisions and/or the information transfer can be improved. However, ICT support for collaborative tasks in some cases can make information and knowledge transfer more efficient (e.g., for non-ambiguous tasks). In other situations it can lead to a loss in communication quality or even misunderstandings (e.g., “very good” used in an ironic sense). Thus, every single collaborative task has to be analyzed regarding its complexity and the equivocality of transferred information. Subsequently it can be matched with a suitable media to support the task.

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<sup>1</sup> Used in the sense of ambiguity. For example, the word “light” can mean both “having little weight” and “bright”. The right understanding depends on the context.



**Fig. 1: The four areas of collaboration**

The current ICT architecture is not satisfying due to its heterogeneous character making it difficult to exchange information between different affiliates. An architecture has to be developed that combines the advantages of local responsiveness (e.g., flexibility, time-to-market) with the benefits of global integration (e.g., lowering of transaction costs, avoidance of information silos). Therefore, the main research question is: How should an ICT architecture look like that enables improved information and content exchange in the identified areas of collaboration of the dispersed sales training process? The associated objective of the authors is to present such an ICT architecture for the support of knowledge transfer and information exchange, based upon the best practices identified in the different affiliates. This architecture gives IT practitioners a detailed proposal for the design of the information and communication technology infrastructure in their multinational company. Secondly, we address researchers by proposing the TMF-matrix as an instrument for evaluating and possibly refining ICT architectures for e-collaboration created in design science processes (Hevner et al. 2004, p. 85).

## Research Methodology

Solving identified organizational problems is one of the key concerns of design science research (Hevner et al. 2004, p. 77). The authors applied qualitative case study research (Eisenhardt 1989; Yin 1994) to learn more about the collaborative tasks in the dispersed sales force training process of Roche Pharmaceuticals. Roche Pharmaceuticals is a division of the F. Hoffmann-La Roche Ltd. and one of the Top-10 pharmaceutical companies in terms of sales and market share. In 2006 Roche Pharmaceuticals generated a revenue 33.294 billion Swiss Francs with its 53,241 employees. The existing ICT architecture supporting the sales training process is diverse due to the strong emphasis on the local responsiveness of the affiliates. Thus, a heterogeneous ICT structure with different applications evolved over the years. Affiliates selected for investigation were Australia, Brazil, Germany, Spain, Sweden, Switzerland, and PRISA (a conglomerate of 23 smaller Central American and Caribbean countries). The investigation comprised a one-day-workshop and several interviews in each of the countries involving all relevant stakeholders of the selling teams (sales management, product management, medical management, trainers, sales representatives, IT department). An overall number of 101 participants from 20 countries contributed to the workshops and interviews. After the cross-case analysis the types of collaboration and their attributes were identified and the TMF-matrix was developed. More detailed facts about the results of the cross-case study analysis can be found in (Heidecke et al. 2007).

## Results

In the following chapter the results of our research are presented. Firstly, we show how we developed the task-media-fit-matrix. Secondly, we apply this matrix on the identified four areas of collaboration. Thirdly, we present the ICT-architecture derived from the results of the application of the task-media-fit-matrix.

### *The TMF-matrix*

Based upon (Reichwald et al. 2000, p. 58) and taking into consideration the task-technology-fit theory (Goodhue and Thompson 1995; Zigurs and Buckland 1998), the authors developed the TMF-matrix. It is intended to fulfil two important tasks. First, training practitioners can use it to justify ICT investments. For example, it can be shown that for average complex training content, computer-based or web-based training (CBT/WBT) is more effective than face-to-face meetings. Besides the fact that e-learning saves money and time (Roshan 2002, p. 47; Youngers 2002, p. 148), the TMF-matrix delivers arguments from a media richness theory perspective.

The media comprised in the matrix were identified in our case study research. We used the evaluation scheme shown in **Table 1** to specify media richness. The criteria were taken from the media richness theory (Daft and Lengel 1986, p. 560). The points were assigned by us in order to be able to rank the different media.

**Table 1: Criteria for media richness**

Criterion	Possible Parameter Values (Points)
Synchronicity	asynchronous (1), synchronous (3)
Senses Stimulated	Optic (1), acoustic (1), optic & acoustic (3), optic, acoustic & haptic (4)
Interactivity Possible	little (1), average (3), much (5)
Personal Feedback	none (0), delayed (1), immediate (3)

In order to be considered rich, a medium had to reach between 10 and 15 points (e.g., virtual classroom with  $3+3+5+3=14$  points). An average medium had to score between 5 and 10 points (e.g., WBT with  $1+3+3+1=8$  points). If a medium had fewer than 5 points, it was considered lean (e.g., e-mail with  $1+1+1+1=4$  points).

Media Richness	Rich	Overcomplication		Face-to-Face / Role Play Virtual Classroom Video Conference Phone Conference
	Average		Intranet-Forum Wiki Multimedia-Weblog CBT / WBT E-Test	
	Lean	E-Mail / RSS-Feed CRM System Object Repository Paper Documents		Oversimplification
		Low	Average	High
		Complexity of Collaborative Task		

**Fig. 2: The TMF-Matrix**

The matrix shown in **Fig. 2** proposes an area of effective communication and collaboration (the area between the dotted lines). Thus, the task-media fit can be assessed by applying the matrix to the identified collaborative tasks. The complexity of collaborative tasks had been determined in workshops and interviews within the case study research.

### Vertical collaboration between global and local selling teams

The global selling teams are responsible for preparing the global sales strategy for a certain product. They develop the key marketing messages that should be communicated in all of the local markets. They also carry out market research about competitors and are informed about the progress of new product development within their own company. Thus, the global selling team provides the local selling teams with some basic marketing and training material as well as market research information. The equivocality of the information exchanged is between low and average (one-way delivery of information with no embedded feedback loop). The TMF-matrix proposes usage of E-Mail/RSS-feed and an object repository. Material can be uploaded into the repository which automatically generates an RSS-feed or E-Mail informing the local selling teams about the newly uploaded material. Additional material uploaded into the local object repositories (e.g., SCORM-compliant learning objects, visual aids) should be synchronized with and transferred to the global object repository using the same media.

Another collaborative task of global and local selling teams is the discussion of customer objections or questions collected from sales representatives. This task implies a higher degree of interaction, feedback, and follow-up. The complexity of this task is between average and high. Thus, proposed media for this task are wikis, multimedia-weblogs, intranet-forums, and telephone or video conferences.

Informal information exchange between global and local selling teams is highly equivocal, requiring very rich media like ad-hoc phone/video conferences or face-to-face meetings. This raises the question to what degree informal knowledge transfer and exchange can be supported by ICT. While the media richness theory says that such highly equivocal tasks should be accomplished using very rich media (Daft and Lengel 1986, p. 560), the media naturalness hypothesis proposes that individuals using low naturalness media to perform collaborative tasks may achieve the same or even better task-related outcomes (Kock 2005, p. 117). Naturalness here is referred to as the degree of similarity to the face-to-face medium. However, the more natural the electronic communication is, the higher the perceived quality (Kock 2005, p. 124).

## **Vertical collaboration between local selling teams and sales representatives**

The local selling teams develop tailor-made marketing strategies for their countries, trying to match customers' expectations and adapting them to the local market conditions and regulations. One part of these tasks is to produce training material (CBTs/WBTs, written material, ...) and train the local sales representatives in a way that enables them to succeed in the field.

Expert knowledge of the medical domain is quite stable and persistent. It is mainly transferred at the beginning of the career of a sales representative or when changing the product line. Nevertheless, this complex content can be equivocal. Thus, media fitting tasks with average equivocality (CBT/WBT, wikis, and multimedia-weblogs) should be chosen for knowledge transfer. Interactivity in sense of a social constructivist learning approach (as described in Bang and Dalsgaard 2006) and usage of multimedia approaches (stimulating as many senses as possible) have a positive effect on learner motivation and satisfaction, as our investigation showed.

Product knowledge training is very much connected to the product and sales life cycle. Therefore, this knowledge is more transient than medical background knowledge. It is closely connected with the marketing key messages that have to be learned and communicated very clearly. As professional sales representatives want to be prepared for bothersome questions and want to be sure that they got everything right, a feedback loop and the ability for direct interaction with the local selling team is necessary during this process. Thus, we propose to apply a combined approach. For non-ambiguous product facts and key marketing messages, media like paper documents or CBT/WBT should be used. Subsequently, this knowledge has to be internalized by applying it in role plays (in face-to-face meetings, virtual classrooms or video conferences). Furthermore, knowledge acquired can be checked by using e-tests to evaluate the learner.

Another important aspect of sales force training is coaching by a sales manager through accomplishing customer calls together with the sales representative (Rich 1998, p. 54). Analyzing possibilities for improvement of the selling process can only be transferred by using very rich media, preferably face-to-face meetings.

As the sales force is the most important interface between the company and the customer, a closed feedback loop has to be established enabling information flow from the customer back to the company. The complexity of this collaborative task depends on the type of information. On the one hand, there is information about the customer call itself (date, time, topics) captured in the customer relationship management system. On the other hand, sometimes there is also additional information in form of questions and objections. It is crucial for the company to gather all these topics and provide their sales representatives with adequate answers and counter-objections as quick as possible. Media like intranet-forums, phone or video conferences, and especially the virtual classroom are suitable for this complex collaborative task comprising highly equivocal information.

## **Horizontal collaboration between selling teams from different affiliates**

Affiliates from countries speaking the same language (e.g., Spanish-speaking countries) can realize cost savings when collaborating closely in the sales force training process. I.e., there is no necessity for each of the countries to develop their own medical background knowledge training. The formalized part of product knowledge training also can be developed and delivered in a collaborative way.

Therefore, the local selling teams have to harmonize their sales cycle, especially the sales training processes. This requires an intense informal knowledge exchange for coordination between the local selling teams. For this equivocal information, very rich media (face-to-face meetings, video or phone conferences) are proposed. For the less ambiguous tasks (like gathering information and ideas regarding the coordinated sales force training process) asynchronous tools like wikis or intranet-forums can be used. All selling team members can contribute when they have the time (and inspiration).

The process of creating training material or WBT/CBT content should be coordinated in a way that avoids "reinvention of the wheel" and parallel development of similar content. The highly complex task of coordination can only be supported by rich media like face-to-face meetings or contact through phone/video conferences. The exchange of learning objects and marketing material can be organized similarly to the material exchange between global and local selling teams by using an object repository.

### Horizontal collaboration between sales representatives

A very important factor for informal learning of sales representatives is the exchange of experiences with colleagues, especially with the ones selling the same product in their affiliate. This kind of knowledge transfer is highly equivocal. Thus, usage of rich media like face-to-face meetings and telephone conferences is proposed.

Additionally, knowledge transfer and collaboration between sales representatives can be fostered by giving high performers the possibility to present their way of selling or their special knowledge to the others in a face-to-face meeting or a virtual classroom. The latter implies the advantage of not necessarily pulling the sales force out of the field. Interactivity is a very important element, allowing the learners to ask questions and talk about topics of interest.

### *ICT architecture for a dispersed sales force training process*

The proposed ICT architecture is designed to bridge the gap between local and global selling teams as well as between local selling teams of different affiliates. Furthermore, it supports information flow and knowledge transfer between local selling teams and their sales representatives in the field. The whole architecture presented in **Fig. 3** comprises components on global, local and individual level. The team portals play a very vital role in this architecture as they provide all functions needed for e-collaboration in an aggregated form. The portals can be operated via the intranet or virtual private networks. For vertical as well as horizontal collaboration between selling teams, the object repositories are very important. They should comprise SCORM-compliant<sup>2</sup> learning objects (CORDRA-indicated<sup>3</sup>) on the one hand and marketing material on the other hand, either distributed by the global selling teams or shared between local selling teams from different affiliates. The human resources database will automatically register completed WBTs and tests via the learning management system (LMS). The content is created by local selling teams using the learning content management system (LCMS). Another important application for formal learning scenarios enabling instant feedback and questions is the virtual classroom.

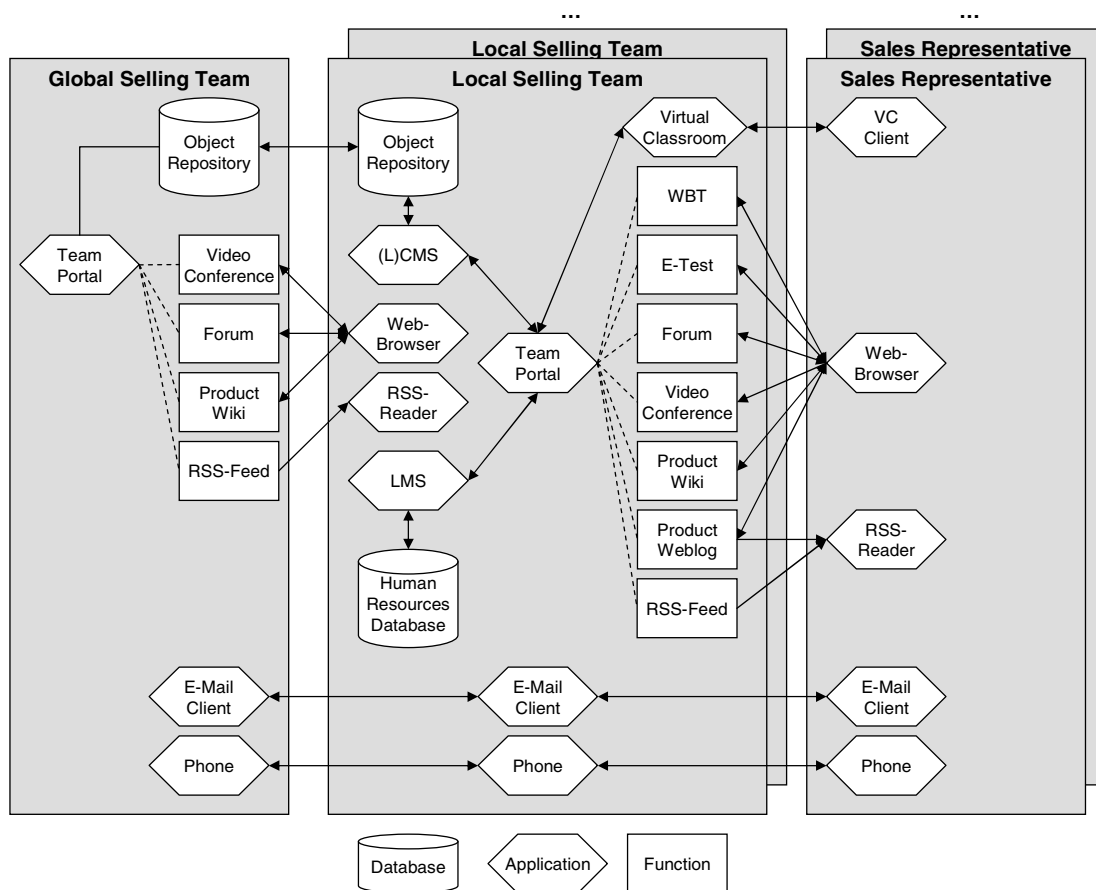
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<sup>2</sup> SCORM (Sharable Content Object Reference Model) is a collection of standards and specifications for web-based E-Learning. It enables the exchange of content between different compatible learning content managemens systems.

<sup>3</sup> CORDRA (Content Object Repository Discovery and Registration Architecture) is an open, standards-based model for how to design and implement software systems for the purposes of discovery, sharing, and reuse of learning content.

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**Fig. 3: The ICT Architecture for Vertical and Horizontal Collaboration**

Wikis can be used for collaborative learning, idea generating, and knowledge sharing. It should be embedded into a constructivist learning approach for group work in virtual product training and as a common knowledge base for each product. Blogs should be used by local product teams for quick information transfer to their sales representatives. Generated RSS-feeds are automatically received by the subscribers using RSS-readers. These can also be installed on mobile phones or PDAs. The video-conferencing function could be either a part of the virtual classroom or an additional stand-alone feature embedded into the team portal. Roche Pharmaceuticals is taking the proposed ICT infrastructure partially into consideration. However, due to the decentralized structure the first step will be to harmonize existing applications and to foster the transfer of the identified best practices from different affiliates.

## Conclusion and limitations

In this paper the authors developed an ICT architecture for the support of a dispersed sales force training process in multinational pharmaceutical companies. A transnational strategy supports such a dispersed infrastructure that enables the enterprise to exploit the advantages of local responsiveness while at the same time fostering collaboration between subsidiaries and the headquarters.

Findings from a study conducted by (Hall 2005) support the transferability of our results on similar collaboration processes in other branches of trade. Nevertheless, as we only investigated one European-based pharmaceutical company, our findings are limited to a certain degree:

Some research indicates that American pharmaceutical companies are not following a transnational strategy with high local responsiveness. They have a more centralized approach of high economic integration and low levels of local responsiveness

(Rugman and Brain 2004) which could require shifting responsibility for several applications and functions of the architecture on to the global selling team level.

A variety of stringent local and regional regulations prevent pharmaceutical companies from adopting a global strategy (Rugman 2005, p. 118). This indicates the importance of high levels of local responsiveness. For successful collaboration – as described in this paper (especially on horizontal basis) – subsidiaries will have to give up a small amount of their independence and contribute content and knowledge voluntarily. However, some research indicates that this is not necessarily the case (Birkinshaw and Arvidsson 2004, p. 40).

Cultural and change management issues were not taken into consideration; we focused on the ICT architecture. Nevertheless, additional research will have to be conducted regarding these issues (e.g., acceptance of e-learning instead of face-to-face trainings, willingness to share knowledge) since they play a very important role when establishing new collaborative sales management and training processes (Rouziés and Macquin 2003). Especially, the cultural diversity of different countries influences technology adaptation and use (Munkvold 2005). Also the transfer of tacit knowledge (e.g., transfer of best practices, coaching) was not part of this work. Such aspects will have to be incorporated into a more comprehensive concept, taking change management aspects and knowledge sharing issues into consideration.

Technical barriers also must be taken into consideration. Although our case study research showed a much higher usage of ICT in sales force training processes in South and Central America in comparison to Europe, these countries are struggling with more difficult conditions regarding the technical infrastructure (e.g., high-speed internet access all over the country).

In addition, we presented the TMF-matrix as a means for both practitioners and researchers. For example, training managers can use it when arguing for investments into e-learning applications. Researchers can use it for theoretical evaluation of the IT artifact as a part of the design process (Hevner et al. 2004, p. 85). However, although many researchers found support for the validity of the media richness theory, some doubt its applicability in certain cases (e.g. Suh 1999) or even its status as a theory (Schulmeister 2006, p. 164). The points in the evaluation scheme used to rank the ICT tools and subsequently to build the TMF-matrix were assigned by us and represent our subjective valuation of the importance of the different parameter values. It would be possible to assign other point values or to differ between several kinds of optic stimulation (e.g., video, image data, text data). This could lead to another ranking influencing the position of the different media within the TMF-matrix. Therefore, the TMF-matrix must be successfully validated in more than one e-collaboration scenario.

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