March 2000

Reflections on Designing Field Research for Emerging IS Topics: The Case of Knowledge Management

Inger V. Eriksson
University of Turku, Department of Computer Science, inger.eriksson@cs.utu.fi

Gary W. Dickson
North Carolina State University, College of Management, gary_dickson@ncsu.edu

Omar A. El Sawy
University of Southern California, elsawy@marshall.usc.edu

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Inger V. Eriksson,
Department of Computer Science
University of Turku

Gary W. Dickson
North Carolina State University

Omar. A. El Sawy
Marshall School of Business,
University of Southern California

inger.eriksson@cs.utu.fi

**RESEARCH METHODOLOGY;
KNOWLEDGE MANAGEMENT**

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Inger V. Eriksson,
Department of Computer Science
University of Turku

Gary W. Dickson
College of Management
North Carolina State University

Omar. A. El Sawy
Marshall School of Business
University of Southern California

inger.eriksson@cs.utu.fi

ABSTRACT

To understand how to improve the research process for future projects, it is useful to take a retrospective view of a research project. This is especially true for emerging topics in IS where many opportunities are available to shape directions and priorities. This article presents a reflective analysis of a field research project in the area of knowledge management. The article examines the process history and assesses the decisions taken and activities carried out in the early formative stages of a field research project. With a detailed anthropological flavor, the paper describes the ins and outs of the various phases of the research process in a narrative experiential way, and analyzes what was learned. The results should be useful for future researchers.

The major lessons learned were:

1.   Retrospectively examining the research of others can be useful in learning how to improve one's ability to do research in a particular area, such as field research in information systems.

2.   Researchers wishing to develop a long term relationship with a host organization may have to be flexible in their research approaches and

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methods, even to the extent of sacrificing rigor for providing outcomes of use to the host organization.

3.   Pilot studies should be carefully designed and executed to maximize learning for later, more extensive studies.

Keywords: Field research assessment, knowledge management, new product development, high technology companies

Editor's Note: To read what follows from the proper perspective, the reader should know that two of the authors (Eriksson and El Sawy) were directly involved in planning and conducting the research study on which this article is based. Although Eriksson is a Professor in Finland, she was visiting at the University of Southern California at the time of the study. The third author (Dickson) was not involved in conducting the study. Rather, Dickson's role was to undertake a retrospective evaluation of the research project. In particular, the three analysis sidebars are his primary contribution to this work.

I. MOTIVATION

From the beginning of Information Systems (IS) as an academic discipline, many of the field's senior researchers have argued for the need to improve the quality of research in the discipline (Keen, 1980). Entire conferences focused exclusively on IS research methods and quality (e.g., Benbasat, 1989). In addition, numerous articles and papers addressed ways of doing better research and training novices to become competent IS researchers (Benbasat and Weber, 1996; Robey, 1996). One metaphor is the guild of the Middle Ages in which workers moved from being apprentices through journeymen and on to masters of their craft. In IS, the notion is to move researchers from being novices (mainly doctoral students) on through mentoring and experience toward being proficient, and then expert researchers in certain sub-areas of specialization and in the use of particular research methodologies. One of the authors of this paper, for example, wrote several articles about learning the trade of IS experimental

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research (Dickson, 1989; Dickson, Jarvenpaa, and DeSanctis, 1985; and Dickson, Lee-Partridge, and Robinson, 1993). A difficulty that beginning IS researchers experience as they try to learn their trade is that the field is so broad and diverse.

Benbasat and Weber (1996) emphasize the pros and cons of the diversity of IS research and explore historical reasons for this condition. Their article covers the research problems addressed, theoretical foundations and reference disciplines, and the methods used to collect, analyze, and interpret data. In this paper, we focus solely on methodological and pedagogical research issues. We adopt a style that facilitates sharing experiences in performing a specific field research project and in analyzing and evaluating the actions taken in performing the research.

Our purpose is to explore the decisions and activities performed in conducting the research in order to learn what was done and why and to evaluate what went well and what did not. In particular, we take a narrative approach, adding evaluation along the way. The results of the research itself are presented only in summary form as they relate to the points we are trying to illustrate about doing the research. The research results are presented in a more traditional form in El Sawy, Eriksson, Raven, and Carlsson (2000) which includes the work that is the basis for this article plus some follow-on research in other organizations (see the Epilogue).

II. BACKGROUND AND GETTING STARTED: CHOICE OF THE TOPIC AREA

The first step in conducting research is to select a topic to research and choose the method that will be applied, such as conduct an experiment or a field study. Robey (1996) drawing on material from Landan (1984), suggests such an approach in justifying quality research. In the present instance, the researchers knew the general area in which they wanted to conduct research, namely

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Knowledge Management (KM). This topic was just emerging at the time the researchers came together as a team. A major influence in selecting this area was the training, background experience, and interests of the researchers. As is the case in many collaborative projects, through conversations and meetings the researchers discovered their common interests and their desire to conduct research in the area. They decided to work jointly as a research team.

As is also most often the case, the researchers quickly found that the general area, KM, was far too broad to research effectively. An early effort in the collaboration involved limiting the scope of the research. The team relatively quickly decided to focus on a sub-area, Shared Knowledge Creation. A key first step in beginning the research was

- to attempt to understand and define Shared Knowledge Creation,
- to make the relationship to IS clear, and
- to relate the results to organizations and business.

In other words, the researchers had to understand the topic they intended to explore and justify (to themselves at least) why it was important to conduct research in this area. This step is important step in initiating research in an emerging area -- to be able to pose significant questions in the research area and be able, to know a priori what benefit might accrue.

Although the decisions may seem simple and obvious when stated here, many of them took considerable thought and effort to develop and refine. The selection and definition of Shared Knowledge Creation was heavily influenced by the work of Nonaka and Tageuchi (1995). The researchers defined Shared Knowledge Creation as:

> *the process by which knowledge is created and shared among and within teams, groups, and organizations*

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(although, as will be seen later in this paper, the research described here dealt mainly at the team level). However, from this beginning, the research team went on to think about the role of Shared Knowledge Creation in business processes.

Particularly in today's global network organizations, in which teams play a central role, the effectiveness and efficiency of Shared Knowledge Creation by teams is important to their success and, accordingly, that of the organization of which they are a part. Thus, the basis for this research is the belief that it is important to view Shared Knowledge Creation as a process whose study leads to improvements.

The researcher's premise was that we must understand how sharing and creation of knowledge (as well as learning) takes place, both in general and in team and organizational settings. Davenport's (1993) expression of the essential role of knowledge in improving business processes is directly related and supportive of these notions.

A next step in the early juncture of the research was to relate IS to Shared Knowledge Creation and business processes. Much is made of enterprises that face hard, global competition and that applied process initiatives as a mechanism for improvements in both effectiveness and efficiency.   Business Process Reengineering (BPR) and Total Quality Management (TQM) represent examples of this approach. These and other process improvement methods are related strongly and to an ever-increasing degree to information systems and information technology. A research area with strong implications for practice is to determine how IS should be designed and used to support efforts such as BPR and TQM for improving and enhancing business processes (Venkatraman, 1994).

From the outset of the research, the team believed that the same was true regarding IT support for Shared Knowledge Creation -- i.e. KM in general and Shared Knowledge Creation in particular can be leveraged through the use of IS (El Sawy et al., 2000). Thus, the long range goal was to work toward discovering how to build a design theory (Walls et. al, 1992) for the IS role in the Shared Knowledge Creation process and, in fact, even begin to build strategic

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information systems which can aid enterprises in coping in a future environment fraught with competition and network-based globalization.

III. SELECTION OF THE RESEARCH STRATEGY

The foundation for the research project was the belief on the part of the researchers that many business processes often are too complicated and ill-structured to be totally formalized. To research all, or even many, business processes is impractical. Even to consider exploring a business process in its entirety was felt by the researchers to present too great a scope to be feasible, particularly given the early state of the research. Therefore, it was believed to be more realistic to focus on important phases of carefully selected business processes. One attractive option for the research was to focus on expected trouble spots that could be identified in a particular phase of a process and to concentrate on Shared Knowledge Creation in and around these spots. These phases, the team believed, could be designated as leverage points where small changes might influence the quality of the process significantly and thus be targets for redesign and IS support (Figure 1).

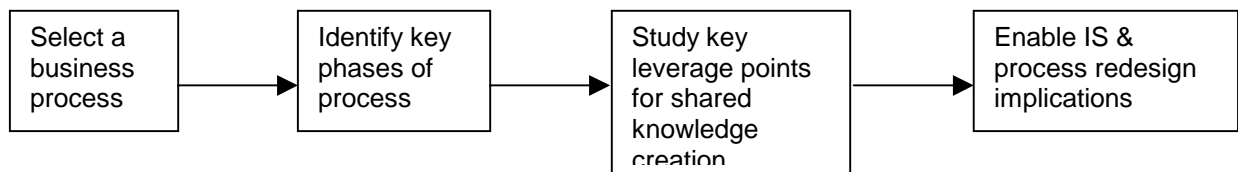| Select a business process | → | Identify key phases of process | → | Study key leverage points for shared knowledge creation | → | Enable IS & process redesign implications |

Figure 1. Study Phases

Thus, the research plan was to study how knowledge is shared and created around leverage points within particular phases of a business process. The objective was to increase the understanding of how to improve not only knowledge sharing, but also the process phase and the information systems that

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support it. A preliminary list of aspects believed to be relevant to the study included:

- team dynamics,
- learning,
- knowledge sharing in the context of a business process,
- business process analysis and redesign, and
- information systems and information technology use to enable and enhance Shared Knowledge Creation.

Dealing with a novel and nebulous concept such as Shared Knowledge Creation suggested that an exploratory research approach was needed. Since the researchers were entering a topic area new to them, it was important to try out the research approach and methods in a pilot. The pilot would be used to learn as much as possible about the Shared Knowledge Creation process and also establish credibility with the targeted organization. The idea was to have a long run research program after initiating a pilot study of limited scope.

IV. CHOOSING THE TASK ENVIRONMENT IN WHICH TO CONDUCT THE STUDY

Given that the goal was to initiate a program of research involving several studies it was believed to be important to select a business process for study that had the following characteristics:

1. it involves teams and Shared Knowledge Creation in intensive ways.
2. it could be observed and its intricacies identified by the research team.
3. the business process is central and important enough to an enterprise so that the firm would be motivated to spend much effort improving it.

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4. the process is pervasive across progressive enterprises globally so that replicable long term studies would be more feasible.

The process that best fits these criteria is the new product development process

The new product development process typically is carried out by teams of professionals. These teams engage in Shared Knowledge Creation as they develop a product. The Shared Knowledge Creation processes are both within the project team and with others outside the team. Furthermore, development of complex new products in global enterprises often involves multiple teams who

- have different skills and knowledge,
- are geographically dispersed,
- may be from different cultures, and
- utilize separate technical products.

Yet these teams must work jointly to successfully develop a product.

Even a core business process such as new product development has infinite variations that offer a rich setting for studying Shared Knowledge Creation. The phases of new product development differ in terms of overlap, concurrency, and iteration, depending on the new product development approach employed, the product being developed, and the industry in which the development takes place. Use of different new product development approaches and techniques results in variation in the phases of the process (Brown and Eisenhardt, 1995). Frequently the phases are based on a standard designed by the organization in question. However, different teams may deviate from the standards causing additional variation in the phases even within one organization. In addition, managers must deal with other problems including unnecessary iterations in the new product development process, and the need to speed up the process to meet competition in the marketplace.

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For all these reasons, the research team believed that new product development was not only attractive for the study from a research perspective, but also that such a study would be of interest to global companies working in high technology industries.

Having completed the background work and the early development of the research plan, the next step for the research team was to find a setting in industry in which to conduct a pilot study. The anticipated results should be enough to convince the host organization to continue with a program of research on Shared Knowledge Creation.

V. RESEARCH METHODS

The topics of interest to the research team concerned knowledge sharing practices, communication patterns, learning strategies, and team dynamics. The last step in the research planning phase was to select methods to explore these topics in the research setting. As will be seen, the team selected specific software tools to test how well these products assisted in analyzing communication patterns and in mapping business processes. In addition, the team believed that the use of these tools would add formality and quantification to yield "hard" results. Other methods were of a more traditional nature, involving structured interviews, questionnaires, use of secondary documents, and statistical analysis.

The general approach envisioned for the research team was to:

- get into an organization,
- meet with some core people in this potential host organization to become familiar with the company,

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- study available documentation to deepen understanding of the environment,

- conduct one hour structured interviews with members from different teams involved in new product development (preferably two different product groups each in different development phases),

- analyze the data, and

- conduct a feedback session for all participants to communicate important findings.

Timing, framing of specific questions, and the selection of participating teams would be done in collaboration with the organization hosting the study. The team believed that studying Shared Knowledge Creation in a new product development environment would require many different types of data, and consequently several types of data collection and analysis.

Quantitative methods and measures are what many organizations and their management ask for -- something measurable and concrete, and seemingly objective. However, qualitative methods are often richer in providing clues and insights, and suitable especially in explorative research and pilot studies. For this pilot research project, the researchers believed that a mix of quantitative and qualitative methods would be complementary and appropriate. However, the research team also believed that, to be most useful and appropriate, qualitative data should be analyzed in a formal and quantitative manner in order to present "hard" data drawn out of soft methods. The proposed approach was to combine qualitative and quantitative measures synergistically. The combination of methods was designed to fully explore and understand a new and complex research area, and to communicate meaningful and engaging results to the host organization.

A key feature of the planned research involved software tools whose usefulness the researchers wanted to test in a pilot environment. Since

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collaboration between teams, not individuals, is essential in the new product development process, the research group wanted to try a communication network tool (the UCINET package from Analytic Technologies) to identify communication patterns of different teams working on the same project. This tool draws communication and information-sharing diagrams that indicate graphically and quantitatively:

- who communicates with whom;
- the frequency, importance, and ease of communication;
- and the type of information being shared.

Business process mapping software (Workflow.BPR from Holosofx Inc.) was selected for test as a tool for documenting team workflow. The data on learning strategies and team dynamics were analyzed using traditional methods.

SIDEBAR 1--ANALYSIS

Let us step aside to analyze what has taken place thus far from the perspective of learning to set up and conduct research. To this point, an experienced team of researchers that was embarking on a new area of research performed in a rather traditional and expected manner. They identified a target area for research and developed specific research objectives and questions. They developed the proper background in the area, Shared Knowledge Creation, and began to limit the scope of their investigation. Also, it is important to observe that the researchers decided to take a pilot study approach to learn more about the domain of their research, test their methods, and learn about a business process heavily involving Shared Knowledge Creation, namely new product development. Although the research was to begin with a pilot study, the researchers intended to pursue a program of research involving multiple studies, of which the pilot was to be the first.

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Another salient point to raise is the choice of new product development as the intended research environment. In this research project, the team selected the task environment (new product development in a high-technology company) before looking for a specific field site in which to conduct the study. Often, another approach is taken and that is to do the general background work and planning (selecting and developing the background in Shared Knowledge Creation, in this case), then look for a potential field site, and then negotiate with the organization as to what task to study (or the business process here). When taking this approach it is often easier to gain cooperation of a host organization since it may perceive more potential benefit from studying a problem of importance to them. On the other hand, the approach taken by this research team of going to the field with a particular task in mind is potentially more risky in terms of securing a research site. Here, not only did the research team have to locate a global organization doing new product development --- they also had to convince the organization that it would be worth their time and effort to let the team in to conduct research on a topic (Shared Knowledge Creation) and in an area (new product development) neither of which may have been perceived to be a problem.

Gaining acceptance from a potential organization willing to host a research study is a general problem faced by researchers conducting field studies. The question that must be addressed is whether to develop a specific research study and then find a willing host site, or to locate a site (target of opportunity) and develop a research project to fit it. Naturally, there are many considerations in deciding which approach to take, but when the objective is to do a series of studies then finding an accepting and supportive research environment becomes paramount. Coming to grips with this issue and the approach taken by the team is a key to what follows in the research story unfolding here.

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Of final note here is the use of multiple research methods. Blending qualitative and quantitative tools into a multi-method approach offers a number of advantages, particularly in exploratory studies. Employing a formal (and quantitative) analysis of the qualitative side of the research is useful because of the blending of interesting summary results, often supported by anecdotes, with the apparent precision of numerical outcomes. The use of the two software-based tools provide quantitative precision and formality to the study.

On the down side of the approach is the danger that the host organization could become uncomfortable with the time and effort required of participants in the study. And, of course, there is further concern that the use of the formalized, software-based tools may not be understood by those involved in the study and those managers in the host organization to whom results will be presented. These concerns all relate to the objective of producing results in the pilot study that will be received favorably by the decision makers in the host organization who will decide to approve future interaction with the research team. The issue here, from the standpoint of the researcher is to make appropriate tradeoffs between the rigor and precision of the research with levels of effort on the part of the host organization and producing results that will be found to be of enough interest and value to continue support of the research.

END OF SIDEBAR 1--ANALYSIS

VI. FINDING A RESEARCH SITE AND ADJUSTING THE RESEARCH STUDY

The research team was keenly affected by the conviction that a major difficulty would be to locate an appropriate research site and then convince that organization of the merits of the proposed research study, even given the justification that the team had developed in the planning phases of the research for Shared Knowledge Creation and new product development. It was

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recognized that companies are busy conducting their business and frequently are not particularly interested in spending time on something that they see little direct benefit from, such as participating in an academic research study. For this reason, the team attempted to describe the research study and its potential benefits as concretely as possible in corporate language. In addition, the pilot project was structured so that data could be gathered quickly, analyzed, and preliminary results be available in a short period of time.

What resulted was a research proposal for a "quick and dirty," business oriented research study instead of a traditional academic one. The whole pilot study, including the data analysis and presentation of the preliminary results was structured to be completed within five days. The thinking was that, in addition to getting preliminary results of value quickly, the pilot study would be an efficient way to demonstrate to the host organization what might possibly be obtained from a full-scale study. This approach was selected to allow the researchers to conduct a study that would provide a way of testing the usefulness of the research approach and instruments while, at the same time, convincing the host organization of the value of participating in additional research. The pilot was intended to be an activity that would not be a huge effort by either the research team or the host organization, and yet would serve as a basis for continuation of the research.

The researchers located a potential research site, a well-known international high technology company, near their location in Southern California. The first step was to convince the company to participate in the study. In an attempt to do this, one of the research team members made a "blind" telephone call to the site manager, followed by several additional telephone calls, faxes and email contacts. The site manager seemed to be increasingly interested in the study. In fact, the manager promised to get back to the researchers about when to start the project and details about what would be expected on both sides. The team visited the site once for a face-to-face meeting with the site manager to

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discuss the details of the project. But then, just when things seemed to be going so well from the perspective of the researchers, contact stopped and nothing was heard from the organization. After waiting for a week or so the researchers again telephoned the site manager only to learn that he was leaving the position and was being replaced by someone else.

The team waited several weeks until a new site manager came on board and re-initiated the contacts much as before. Getting started with the pilot study was of increasing importance to the researchers as one of the team was leaving Southern California and returning home to Finland. Fortunately, for the research project, the new site manager quickly approved and scheduled the pilot research study. In summary, it was agreed that the main purpose of the study would be to enhance the understanding on the part of all parties involved in the research how performance is influenced by ways of knowledge sharing. For the organization, it was felt to be relevant to learn the communication patterns within and between teams in order to speed up the new product development process and lessen unnecessary iterations between process phases, and thus reduce rework. An additional anticipated benefit to the company was learn how to deal with personnel changes on projects and how to bring newcomers up to speed quickly on the status and details of a project. Once agreement was reached on objectives, deliverables, and logistics, the project was quickly launched including adjusting the draft proposal to reflect the outcomes of the discussions with the company. The final set of research topics included:

- Team dynamics: Composition and dynamics of project teams

- Learning strategies: How newcomers to projects are integrated into the teams and the project, how continuous learning takes place, and how the knowledge of exiting team members is captured (i.e., entry and exit strategies)

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- Knowledge sharing: How knowledge is communicated and shared among and between teams
- Business process: Major aspects of the new product development process and associated trouble spots

Discussions with the host organization resulted in two new product development projects being selected for the pilot study. The research team had requested two projects that were in different project phases to increase the chances of uncovering KM behaviors. The larger project, with 90 team members, involved the final phase (pre-production), and the smaller (20 team members) was early in the new product development process involving "Program Planning and Business Commitment."

To gain preliminary understanding of the company and the two teams which were to be studied, the researchers conducted interviews with the new site manager as well as with program and project leaders. Documents about the company and its product development process were also studied. Then the team engaged in several activities (described below) to involve participants in the study and to gain more support from project management. The team believed it was important to project acceptance that the researchers go beyond simply obtaining approval from the top management to conduct the study. Thus, early participant involvement was envisioned as one way of gaining support from those directly involved in the study.

The research plan called for interviews with 16 members from the two project teams. Before these interviews took place, however, a preliminary meeting was held to introduce the research project and its purpose. Attending was the site manager who served as a liaison with the research team. Line managers, the program/project managers, and some of the team members also attended the meeting. One objective of the meeting was, after the project was

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explained, to solicit input from those attending as to their expectations about what the study might produce of value to the company.

Before data collection started, the research team also had additional discussions with both the site manager and the project/program managers about their particular expectations, for both short term and long term outcomes that could be provided by the pilot and future studies. Through these meetings, more background was gained about the two projects and the project phases including: communication patterns, communication intensity throughout the process life cycle, types of knowledge involved (product, process, organizational values) and its granularity, and the nature of the formal development process (at corporate, site and discipline levels, and their interdependencies). One issue that came up at this point involved the communication patterns. The company wanted these on an individual basis (who communicate with whom plus how and why). The research team, however, felt that this would be a violation of participant confidentiality and held out to report only on a team basis.

As before, the team felt that, to be perceived as believable, it was crucial to spend the time necessary to find out as much as possible about the company and the processes to be studied. The study participants were recognized as the topic experts and in the interview sessions the team knew that it would be necessary to phrase questions and probe for answers in a manner that would be respected by those being interviewed. Further, this familiarity would be useful when presenting the results of the study and selecting the important issues for emphasis. The team was delighted, therefore, to be invited to participate in an internal seminar that was being held on new product development process design. The seminar provided the opportunity to learn what was considered to be difficult and what were selected as priorities for improvements in process design methods. The process model, quality as interpreted by the host organization, and measurement of progress were all issues on which the team gained a greater understanding by attending the seminar. System partitioning

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between different disciplines (e.g., software oriented, hardware oriented), and whether partitioning occurred too early or too late was one issue receiving attention. Another key issue related to the study was how to deal with changes in specifications during the process, how to know who is concerned about these changes, and how to inform them.   Shorter iteration loops and improved documentation as well as improved communication were mentioned as possible solutions for the decision and design errors in the process.

For the researchers, these contacts were vital learning opportunities. They also showed that the research team had something of value to offer as compensation to the project for their time and support. To become integrated with those supporting and involved in the study, the researchers also interacted socially in the company's "beer garden" (which is a part of its organizational culture for enhancing informal communication) after some of the meetings.

SIDEBAR 2--ANALYSIS

The research team did an effective job of overcoming one of the major barriers to conducting field research, gaining entry to a willing research site. By focusing on a "quick and dirty" pilot study, to be performed completely in only five days, they made their research project more palatable to potential research sites. Further, they enhanced the attractiveness of the proposed study by trying to make it as business oriented as possible (as contrasted with being a more typical hypothesis testing academic study). One thing that supported this approach was the fact that the researchers were at an exploratory stage, perhaps with independent and dependent variables identified and the hypotheses in mind. They were able to investigate the hypotheses rather than treat them in a formal manner. In addition, a major benefit, even from a compressed study, would be the testing of the research method, questions, and the analytical software tools.

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That the researchers were in a location (Southern California) with many global, high technology firms was fortuitous in providing many options all in relatively close proximity. It is notable that the team gained entry on the first try, more or less using a "cold call" approach. Normally, one might expect that several contacts would have to be made before gaining acceptance for a study. This result suggests that the team had done an acceptable job of structuring the research, being able to explain it quickly and making potential benefits clear for a host organization. Making a face-to-face visit early with the contact was also an important step in gaining acceptance and beginning to build a relationship of support and trust.

It was at this point that the researchers encountered the reality of doing field research in today's dynamic and fluid organizations. Soon after they expended the effort to achieve what was apparently beginning to be the basis for a good relationship with a key individual supporting the research, he was transferred to a new position within the company and the team had to go back to the beginning and start all over with someone else. Given what happened later, it is also important to note here that, due to the member of the research team that was visiting in the area being soon scheduled to return home, time pressure was starting to build to complete the pilot study.

Once entry to the organization was regained, the team was successful in working with the new site manager to clearly define and agree upon the study's goals from both the organization's and the team's viewpoints. It is important that expectations be managed in situations such as these to bring an initial project to a conclusion that increases the likelihood of future relationships. That the project plan was adjusted to fit the agreed upon revisions was also an important step in gaining support from the host organization.

The scope of the pilot in examining four areas was reasonable. In addition, what the team was looking for seems to have been well defined at this

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point. The selection of the four areas also allowed data to be gathered efficiently and the results to be categorized conveniently. The use of two teams, at various stages of the new product development process and of differing composition, also appears to have been a good approach. Using only one team would not provide the requisite insights since only one set of NPD development phases would have been present. Using more teams would be beyond the capability of the small research team given the time period available to them. The examination of the company documents to obtain a general understanding of the process and the normative way it was supposed to be done was a starting point and provided a useful basis for comparison for how the teams were to say things actually were done.

The methods used by the research team to gain acceptance by the organization and the study participants should also be examined carefully. Even with a short timeframe, the use of the preliminary meeting attended by key managers and study participants was an effective attempt to inform, clarify, and get the key players involved in beginning to be part of the research project. In general, such activities form the basis for organizations, managers, and others involved to begin to take some ownership of the research project. The fact that the team was invited to the internal seminar and the social event were signs that their initial attempts at being accepted were working. In addition, the seminar was an efficient way to get more general background on new product development as performed within the host organization. Through this phase of the project, matters both from a research perspective and for forming a strong relationship at the research site would seem to be going well.

Finally, before going on, one event that occurred is worthy of additional comment. The company wanted detailed data from the study that the research team felt exceeded the ethical bounds of the research: the identification on an individual basis of who communicates with whom, when, and why. This issue often occurs in doing field research, namely that organizations frequently want

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detailed individual data whereas researchers feel compelled to protect the individual and only report on an aggregated basis. Living within strong research cultures with strict policies, researchers often find themselves in conflict with the desires and belief systems that exist in organizations. Sometimes these differences can be fatal to research partnerships with the result that studies are stopped or halted while in progress. In this instance, the researchers were successful in adhering to their commitments while convincing the organization that their approach would still yield acceptable results. Again, looking forward to the outcome of the study, one cannot help but wonder what would have been the effect had the organization been able to receive results on an individual basis.

END OF SIDEBAR 2--ANALYSIS

VII. CONDUCTING THE STUDY AND ANALYZING RESULTS

Because one of the researchers leaving the Southern California area in which the pilot study was scheduled (Section 5), there was great pressure to complete the data gathering, analysis, and reporting quickly as had been promised to the company. Thus, the two researchers collected the data during two days of intensive interviews and did the data analysis over the weekend which followed. The data was analyzed using the communication network analysis and process mapping software packages, as well as through standard statistical software. Late in the weekend, the research team pulled together the preliminary results in the form of a presentation to be made to managers and study participants in the host organization on the next Monday. The hasty and intense analysis thus met the promised five day feedback commitment made by the researchers. Some, but not all, of the study participants who were invited to the presentation attended.

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To evaluate the process, it is useful to examine briefly the results the researchers presented. These results provide a more detailed understanding of the goals of the research and the specific questions that were asked to meet the goals.   Along with the findings, some evaluation is also provided concerning problems with the research methods and tools.   The results in the major topic areas explored in the pilot study are described below.

TEAM DYNAMICS

Both work mix and team mix were studied.   Work mix was found to be such that program oriented team members spent more time working alone while systems oriented team members spent much of their time working with others, most frequently in face-to-face meetings.   Given this result, the type of communication, including the type of technology support that would effectively support these different patterns of work was proposed as a future area of study. Team mix questions consisted of two parts:

- those involving the mix of expertise and
- character mix in successful teams.

It turned out during the research that the concepts, as presented in the interviews, were interpreted quite differently among the participants even though they were provided definitions of the concepts in the interviews. Thus, individual responses turned out to be not quite comparable. The participants were asked about their present situation and a preferred "would be" situation about team composition.   The data analysis found that there were no differences between the "as is" and the "I wish" situations. One interpretation of this result would be to conclude that the team members were satisfied with the current situation. However, there was the belief on the part of the researchers, perhaps because problems with the participant's understanding the definition of the concepts, that the interview approach that was used failed to test the construct that was intended.   This conclusion can be illustrated by an example.   Although the

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number of novices in the teams was quite high, this staffing was considered to be a favorable practice. At the same time, participants said that there was a need for more competent people on the teams. Thus, in any future study, there would have to be more work and testing of implementing the construct of technical expertise.

LEARNING STRATEGIES

This area was believed by the researchers to be of particular relevance to a fast developing organization with an active recruiting program and high levels dynamics in team composition. The interviews included listing several common strategies for introducing newcomers into organizations and teams. Participants were asked to rate the strategies on a Likert type of scale with regard to how common they were in the organization and how effective they were considered to be. The results were that the most common strategies used were

(1) small, easy tasks to do first,

(2) assigning a mentor, and

(3) internal training courses.

In terms of effectiveness, the strategy ratings were:

(1) assigning a mentor,

(2) making people feel comfortable and welcome, and

(3) small easy tasks to do first.

There were considerable differences of opinion, however, and the correlation was low between what was perceived to be a common strategy and the effectiveness of the strategy.

On probing during the interviews, the participants suggested some of their own strategies for ramping up that were not being used by the company, and obtained participant reactions to these. Participants frequently stressed the importance of giving newcomers the big picture and seeing how the individual's jobs fit within it. They also mentioned that learning on a team level, rather than on an organizational one, is important. Generally, the team members had the

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opinion that this organization "cared about them." This view was reflected by favorable comments regarding sending new people to training programs rather than sending the more senior people as was felt to be the case in other organizations with which the participants had familiarity. Opinions did vary, however, regarding whether continuous learning was encouraged and supported. Graduate education, for example, was felt by some to be encouraged but not well supported.

Exit strategies (for those leaving the teams or the company) were also investigated. The results here were that participants failed to perceive any formal exit strategies being used by the organization. Capturing knowledge on exit from the team or the organization was felt to be based on an individual's initiative rather than that of the organization. Project documentation was rated to be good but a number of participants thought that it could still be improved.

KNOWLEDGE SHARING
The topics investigated in this area included the

- frequency,
- ease,
- perceived importance, and
- the types of communication as well as the means of communication both within the team and external to the team.

The types and purposes of communication were categorized as informing, coordinating, and collaboration. These three levels were easily recognized and differentiated by the participants during the interview process. One general finding was that the type and intensity of communication depended on the phase of the new product development project. Cooperation regarding the achievement of project milestones was considered essential by the project/program leaders, but big problems were said to occur when there had been some changes in

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some of the concurrent sub-projects and the communication regarding these had been unsatisfactory. One thing that occurred to the researchers was that external communication between teams was at least as important as communication within the team, and the external communication stood out as an area that could be improved. The researchers suggested in their presentation that these external contacts would be useful for knowledge creation purposes and that some of the ideas that they brought in might be catalysts in rethinking the new product development process.

The software package employed in the research was used to draw communication patterns. From the results, the researchers were able to examine communications patterns of all groups or zoom in on one group's communication behavior. One result of this analysis was to show how some team members thought teams were collaborating with others. However, the team with whom the collaboration was thought to take place perceived that one way communication (informing rather than collaborating) was taking place.   In addition, it was shown that there was asymmetry in communication (one party was seen to be putting forth much more than the other). Thus the mapping software highlighted situations in which there were perceptions of imbalances and asymmetry in communication.

Media choice was also examined, but the results were as might be expected. That is, internal face-to-face communication was preferred followed by telephone and then email.   Externally, communication with suppliers and customers was primarily via telephone or fax and email for other external parties. Email was preferred when only information was to be passed, but when coordination and collaboration was involved, face-to-face meetings were strongly preferred.   As will be seen, the research team made recommendations for managing the teams from these findings.

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BUSINESS PROCESS

Again, this area was investigated in terms of how it was perceived to be done versus how it should be performed (descriptive versus prescriptive/normative analysis). In addition, aspects of the process were isolated at the local level. The workflow was analyzed using the business process mapping software. The result of importance to the researchers was to learn that many activities described in procedure manuals as being serial were actually taking place in parallel. The software, using input from the interviews, showed how reality differed from what was documented as taking place. From the interviews, it was also learned that reusing ideas from before (e.g., software code) goes on as part of personal contacts and relationships and mostly informally. One problem that was perceived to occur involved changing requirements and the difference between real requirements changes and feature additions that "would be nice to have." The software tool helped identify where reuse would fit in the process model, as well as handling changes in requirements and requests for features.

According to the interviews, managing the risk of new technology was difficult. Estimation of risks and identifying alternative designs were thought to be particular problems. More frequent milestones were suggested as one mechanism for dealing with this situation. A final, and important, point that emerged, involved dealing with adapting to an organizational culture and management style in a multicultural environment.

VIII. FEEDBACK OF RESULTS

The research team quickly had to summarize the results of the pilot study for a presentation at the host organization. To review, data was gathered in a two day period, analyzed over the weekend and a presentation put together which was delivered at the company the following Monday. The site

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manager/study liaison, the two program/project managers, and the study participants were invited to attend a presentation of the study results. Few study participants attended the feedback session. The poor attendance on the part of the study participants surprised the researchers given that many more had attended the earlier meeting on the nature and objectives of the study.   In addition, the participants who did attend the results meeting were much less active in their involvement than in the planning meeting or in the interviews.

The presentation was designed to stress the results that could be used by the company to improve the new product development process. In general, the presentation focused on what the research team considered to be important issues and actions that were suggested on how to improve the new product development process through better communication and knowledge sharing. For example, related to the summary above, findings and recommendations were made in regard to a number of topics addressed in the research. One focus of the presentation was on findings that the researchers thought would be of interest to the company. Examples include:

- Program-oriented team members tended to work mostly alone whereas systems-oriented members spent more time working with others.

- The importance that was attributed to giving newcomers to teams a big picture orientation.

- The failure to perceive exit strategies.

- The company had sites throughout the world, but electronic conferencing facilities (which were available) were seldom used. People traveled for face-to-face meetings.

- Formalizing reuse of knowledge (ideas and code).

Finally, the team identified areas in which they thought additional study would be of interest and benefit to the company. One example was to further explore the type of communication that would best be suited to fit differences in

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the program-oriented versus systems-oriented team members. Another example was to suggest some additional work to include external parties to the teams with a fresh perspective to see, if in appropriate and substantive areas, their view matched those of the team members. Findings regarding the research methods and procedures employed (e.g. concepts and questions to be revised, changes in how the software packages are to be used), were not brought out in the meeting with the company. The meeting concluded with the company representatives expressing interest in the findings and indicating that the activity was worthwhile for them. At this time, the visiting member of the research team returned home.

Time passed and nothing more was heard from the company so follow-up was initiated by one of the researchers. A telephone call established another organizational change. The site manager/liaison had moved (as had his predecessor) on to a new job at a site in the company's home country. An e-mail message was sent to the site manager who was the liaison during the study asking about what the company did with the results of the research and if any changes in practice had occurred as a result. The manager responded, via e-mail, that the organization had not used the results at all. He stated that he thought that the reason could be attributed to his leaving and that there was no "owner" of the project when he left. He went on to suggest that, in future projects, any research phase such as the pilot study should have agreement on what follow-up activities will be (such as more study) and who owns these future activities should be established. Although not certain, the researchers gained the impression that activities and clearly identified responsibility for them was a strong part of this company's management culture. The research team was disappointed that the pilot study results were not used and that there appeared to be little chance of future cooperation from the company site that participated in the pilot study.

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One way of beginning to assess the outcome of this research project is to refer to the old expression of winning the battle but losing the war. In this case, the battle was conducting a pilot study and learning from it. The war refers to the team's objective of having the pilot study serve as a basis for a continuing research relationship with the host organization. First, consider what was learned from the pilot about studying shared knowledge creation within the environment of new product development.

The researchers tested their approach and tools. They found that the approach and methods did yield insight in the areas studied. They learned about things such as: using company records and procedures to establish a basis for research, how they might refine some of the interview questions for future studies, and the advantages and the limitations of the software tools that were employed. In addition, the researchers, having the results generated from this study, are in an excellent position to identify dependent and independent variables and generate testable hypotheses in future studies. This would follow the approach normally associated with a program of research within a particular area. On the other hand, if such future work is to be conducted, a new site must be found. And, even if a site is found, such a study could also end up as a one-time affair. Here we want to turn our attention to the issue that has been at the forefront since the beginning of this paper the goal of establishing a long-term research relationship in which to conduct field research.

The researchers were thinking about establishing an ongoing research relationship from the outset of their work. And, one can see much evidence as to how the research team attempted to achieve this outcome. The efficient five day pilot study, clearly spelling out the potential benefits to a host organization, the revision of the approach and the deliverables based upon interaction with the managers at the organization, the meetings, and the attempt to involve the

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participants in the study are just a few examples of tactics that were employed to gain acceptance and provide value to a potential long term research site. Yet, despite all their good intentions and actions, the team failed to achieve their objective. In an attempt to explain this outcome, a number of questions can be raised.

- *Were the researchers victims of circumstance and, to a certain extent, simply unlucky that certain uncontrollable events occurred?*
- *Is there anything that could have been done that would have reversed the outcome?*

  -Was the pilot study too quick and dirty?

  -Was the study, despite efforts to the contrary, too academic?

  -Even given the turnover at the top, could anything else have been done to establish continuing support through a champion?

  -Could the presentation at the final meeting have been done differently and in a way that the company would have perceived more benefit and, thus, might have more interest in continuation?

- *Finally what do we learn, as researchers wishing to work in the field, from this experience?*

We will hold the last question until our concluding section, but will address the other questions here. One way of explaining what happened is to conclude that the researchers were simply unlucky. The turnover in the site manager position and the time pressure caused by one researcher scheduled to return home certainly were related to the team's failure to establish the sought out continuing relationship with the research site. Still, the team took a number of reasonable actions aimed at creating the desired relationship. Specifically, they sought to establish relationships with managers other than the site manager as well as with team members. Further, even despite the time pressure, the pilot study was conducted and a final presentation delivered according to the tight time schedule promised to the company. Given the setting, the actions by the

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research team, and the outcome, it may be instructive to explore a number of issues in a constructive manner.

The first issue involves the "quick and dirty" nature of the pilot. As matters turned out here, with the departing researcher, the fact that the pilot was designed to be done rapidly can be viewed as extremely fortuitous. Had it not been originally structured in this manner the team would have been scrambling to cut back their study to save time with the likely result that it might have yielded less both from a research learning perspective and in providing useful results to the host organization. Still, in general, the team might have allowed more time for the "entry" phase of their pilot by scheduling a longer time period to work with the organization to adjust the nature and, to some extent, the focus of the study. Such extension would allow for more up front meetings and more interaction with the client organization, and thus increase the likelihood that stronger relationships could be established (indeed beyond the site manager) and that issues important to the company could be highlighted. The time to gather data, both the elapsed time and the amount of time taken on the part of participants, seemed to work well. Another place to have added time might have been at the back end in order to have more time to work on the data analysis and preparation of the presentation to provide output from the study that would be attractive to the company. We will return to this topic again shortly.

One observation that can be made that applies generally to field researchers is that their studies focus primarily on issues of interest to the researchers themselves, namely academic ones. The reader may have noted that this analysis has had a fair amount to say about the academic nature of conducting the study; the background and setup, the entry into the organization, the methods and analysis, etc. However, perhaps in situations such as this one, researchers might consider including some issues in the study that are only of interest to the host organization. In this instance, for example, might not the research team have used the early meetings to explore with the company personnel issues only perhaps tangentially related to the research that might be

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of particular importance to the company that could be included? In the study reported on here, of course, we have a situation in which the company was interested in reporting on an individual basis which the researchers felt violated the confidentiality that had been promised to the study participants. But perhaps the research team could have exploited this situation by explaining to the company how they felt it was important to provide useful output for them and to work to find other areas in which the team could, ethically, provide information that was sought by the host organization. In other words, build into a study specific results perceived to be important to the company even if these were not part of the original research design. Reporting on these results may also enhance the perception of the presentation from the company point of view and diminish the chances that the study will be received as too academic. Taking these suggestions, however, is not without peril from the perspective of the researcher. One obvious problem is that the interviews and data gathering become too time consuming and complex. Another less obvious potential difficulty is that the researchers lose control of their research objectives and become under increasing pressure to produce practical results for the company that take on a distinct consulting flavor. This is a gray area and one that can pay dividends for gaining acceptance of a research study but also one in which it is essential to achieve a clear understanding between all parties of what is to be expected and delivered by the researchers.

In performing what can truly be called joint academic/practitioner research, it is important to have a strong supporter of the project within the practitioner community, in other words, a champion. In the instance reported here, the researchers attempted to build a relationship with a person they considered key, the site manager. Turnover in this position, however, made it difficult for the team to establish the site manager as their project champion. Knowing from their experience that the site manager position was volatile, could the team have spent more time and effort trying to forge a relationship with another key person, for example one of the program/project managers? One can only speculate on

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this point as to whether the people in these positions would have been the right person, interested, and have less potential for rotation among jobs (the researchers would suggest that the program/project managers would not have met these conditions). Still, making a valiant effort to find and gain support from a strong project champion can be extremely worthwhile in situations in which a close and long term relationship is being sought.

Two personal experiences with research relationships are worth recording here. They involved an academic research team and two host organizations that became extremely close and long term (both at least five years and involving multiple relationships and studies). The one aspect that sets these two situations apart from the study described in this paper is the manner in which contact was made between the host organization and the research team. Recall that in this Shared Knowledge Creation/new product development study, a cold call contact was initiated from the researchers to the potential research site. In the other two instances, the reverse was true.

In the first case, the research team was contacted by a practitioner in the audience of a conference presentation in which research activity was discussed (DeSanctis et al., 1992). This contact with the researcher making the presentation led to further discussion and eventually a long term relationship between the researchers and the organization. In the second case, a member of the research group was contacted by someone from industry that had read a journal article written by the research group (DeSanctis et al., 1996). The same thing happened as in the first case, a multi-year research relationship. Both these projects, incidentally, had a number of practical aspects beyond their research orientation that had the potential to be of interest to the practitioner community. It also may be of interest to learn that, in both these cases, there is still a strong personal relationship between members of the research team and the practitioners that has remained in place long after the stream of research finished. To be more specific, friendships developed to the extent that the

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researchers and those from the organizations still are in fairly frequent contact some five years after the last research study in the program of studies was completed. Also perhaps of note, is that both situations were in different geographic locations (airplane distances) from the site of the research team.

These situations are not directly comparable to the pilot research described in this paper for a number of reasons, the main one being that both research relationships which became ongoing started at a much later stage in a program of research and were supported by a visible track record of output that was available to interested parties. In other words, the research program was far beyond the pilot study stage that is the case in the Shared Knowledge Creation/new product development study being explored here.

There are several valuable messages to field researchers from these experiences. One is to provide support for the potential importance of establishing a close and long-term research relationship with organizations (and there were strong champions in each instance). The second message to note is the value that can sometimes (perhaps too infrequently) come from structuring one's academic work such that it has value to the practitioner community and presenting results at a forum in a way that can be seen and appreciated by this audience. Before leaving this point, it should again be noted that the research team conducting the study described in this paper did recognize the importance of relationships and a champion and worked hard in this area, but that it is a difficult area in which to be successful particularly when the initiation of the project comes entirely from the research team side.

The nature of the final presentation is one that may be explored in terms of its focus and how it might have better enhanced developing a longer term relationship between the researchers and the personnel within the host organization. Perhaps the team could have structured the presentation around specific recommendations to the company, but were hesitant to do so given the

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exploratory nature of the pilot. Such a structure is in contrast to presenting research findings. Normally in organizational presentations, researchers tend to present findings and then, at the end of a presentation, make some practical recommendations. Instead, the focus might start with the recommendations at the beginning and present the research findings only as they support the recommendations. In this way, emphasis is placed on those things that be perceived by the organizations as being of most value.

END OF SIDEBAR 3--ANALYSIS

IX. CONCLUSION

We started out this paper with the premise that it may be useful in emerging areas for research to take a retrospective view of the formative stages of a research project to understand how to improve the research process for future projects. This premise is especially true for emerging topics in IS where there are many opportunities to shape directions and priorities. This paper is a reflective analysis of a field research project in the area of knowledge management. The paper looks back at the process history and assesses the decisions taken and activities carried out in the early formative stages of a field research project. It explores the decisions and activities performed in conducting a research project to learn what was done and why, and to evaluate what went well and what did not. Our intent has been to present a description of a specific research study in a field setting which provides the basis for consideration, discussion, and learning. We hope it provides a useful example of retrospective analysis and a learning experience for both those wishing to do similar research studies in emerging areas, and those who want to carry out their own reflective analyses.

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EPILOGUE

The researchers did not give up on their study of Shared Knowledge Creation in the new product development setting. They conducted subsequent studies in the area, both in the United States and in Europe. The study in the United States was in a different organization than the one described in this paper. In Europe, success was achieved in creating relationships with other organizations that resulted in a series of studies. What was learned from the pilot research described in this paper was particularly useful in moving onward in both the United States and European studies.

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ABOUT THE AUTHORS

Inger Eriksson is a Professor of Information Systems at the University of Turku (Finland). She received her Ph. D. degree from Åbo Akademi University. Professor Eriksson also was on the faculty of the Swedish School of Economics and Business Administration in Helsinki for eight years. She has held visiting faculty appointments at The University of Arizona, The University of California-Los Angeles, and The University of Colorado-Colorado Springs. Prior to her academic career, she was in business for 15 years. She has conducted research and written extensively in such areas as knowledge management, user training and information systems quality. Currently, she is working on ethical issues in IT/IS and computer literacy for national productivity.

Gary Dickson is a Professor of Information Technology in the College of Management at North Carolina State University. He was, for 29 years, a member of the Management Information Systems faculty at the University of Minnesota. While at the University of Minnesota, he chaired 26 doctoral student theses. He is a co-founder of the first MIS program and research center in the United States, Founding Senior Editor of the MIS Quarterly, and General Conference Chair of the First International Conference of Information Systems. He is author of more than 100 articles, conference proceedings papers, and book chapters. He has also published 4 books and monographs. His current work involves computer literacy for national productivity.

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Omar A. El Sawy is Professor of Information Systems at the Marshall School of Business at the University of Southern California. His research interests include redesigning enterprise processes and supply chain processes for e-business, and the improvement of knowledge management practices. His writings have appeared in both information systems and management journals, and he serves on five editorial boards. He is the author of the forthcoming book Redesigning Enterprise Processes for e-Business (McGraw-Hill, in press). He holds a Ph.D. from Stanford Business School, an MBA from the American University in Cairo, and a BSEE from Cairo University. He has lectured and consulted in Asia and Europe, and in 1997 was a Fulbright Scholar in Finland. He is currently involved in several field projects on e-business and knowledge management in the USA, Europe, and Egypt.

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