Implementation Partner Involvement and Knowledge Transfer in the Context of ERP Implementations

Marc N. Haines
School of Business Administration
University of Wisconsin–Milwaukee

Dale L. Goodhue
Terry College of Business
The University of Georgia

Enterprise Resource Planning (ERP) systems are difficult and costly to implement. Studies show that a large portion of the overall implementation cost can be attributed to consulting fees. Indeed, hardly any organization has the internal knowledge and skills to implement an ERP system successfully without external help. Therefore, it becomes crucial to use consultants effectively to improve the likelihood of success and simultaneously keep the overall costs low. In this article the authors draw from agency theory to generate a framework that explains how consultant involvement and knowledge of the implementing organization can impact the outcome of the project. Portions of the framework are illustrated by examples from a series of interviews involving 12 companies that had implemented an ERP. It is suggested that choosing the right consultants and using their skills and knowledge appropriately, as well as transferring and retaining essential knowledge within the organization, is essential to the overall success of an ERP system implementation.

1. INTRODUCTION

Enterprise resource planning (ERP) systems are standard software solutions that provide integrated transaction processing and access to information that spans multiple organizational units and multiple business functions. As Davenport (1998) pointed out in a *Harvard Business Review* article, the promise of an off-the-shelf solution to the problem of business integration is enticing, but there have also been several horror stories about failed ERP projects, in which organizations sustained substantial losses or even went bankrupt (Davenport, 1998; Zeitz, 1996).

Understanding the factors that lead to successful implementations of information systems (ISs) in general has long been a key interest for practitioners as well as many IS researchers (Haley, 1997; Ross, 1999; Zmud, 1980). Identifying factors leading to success or failure of ERP systems in particular is of increasing importance. Not only are many organizations choosing ERP systems (Deutsch, 1998), but especially in the context of e-business, integrated standard solutions that go beyond the original ERP systems are increasingly important.

Although there appear to be many different factors that have an impact on the success of ERP implementations (Sumner, 1999), project management factors are frequently cited as playing a crucial role (e.g., Davenport, 1998; Jiang, Klein, & Balloun, 1996). In addition, studies show that a large portion of the overall implementation costs can be attributed to consulting fees (Meta Group, 1999), which can easily be four to eight times the cost of the software (Zeitz, 1996). An exploratory study conducted by the authors with the goal of eliciting potential ERP success factors confirmed the importance of several project management issues, such as implementation partner (consultant) involvement, management support, and project team configuration. From this study, two issues related to implementation partners appear to be particularly important for ERP implementations; first, the extent of the involvement that consultants have and second, the level of knowledge held by the organization implementing the ERP system (the implementer) as well as the transfer of knowledge between the vendor, consultant, and the implementer. Although the relationships between vendor and implementer and between vendor and consultant are also interesting, in this article we focus on the relationship between the implementer and the consultant. Not only are the costs of consulting services very high in proportion to the overall implementation costs, but in addition the implementer has a large variety of options in terms of choosing a consulting service and its involvement. In this article we develop a framework to explain how project outcomes are affected by the involvement the consultants have and the knowledge an implementer has or acquires. The argument is rooted in agency theory (Eisenhardt, 1989) and illustrated with experiences from the cases from an exploratory study conducted by the authors.

2. CONCEPTUAL FRAMEWORK

In this article we address the following questions from an implementer's view:

- How does the amount of involvement of consultants impact the project outcome?
- How does the knowledge held by the organization implementing an ERP system impact the project outcome?

In the following section we define and describe the essential concepts of the framework and its theoretical foundation. This framework is then illustrated and discussed with evidence from cases.

2.1. The Implementer–Vendor–Consultant Triangle

In an ERP system implementation, there are usually three major parties involved (see Figure 1): the organization implementing the system (the implementer), the organization that developed the ERP system (vendor), and an organization aiding the implementation (the consultant).

Each of these three parties contributes in different ways to the project. The implementer has the detailed knowledge of its own particular business processes, organizational context, and competitive situation, which is essential for successful implementation. The vendors provide the implementer with hardware and software and offer training programs in connection with their products. The consultants are brought into ERP implementation projects to provide additional skills, knowledge, or simply manpower that is not available at the implementer or the vendor, or is too expensive if procured from the vendor. This type of knowledge is typically detailed knowledge of the hardware, software, and implementation process. It includes knowledge of how to configure the software to meet business requirement needs, as well as organizational change expertise when business processes will need to be changed. Figure 2 shows a typical scenario of knowledge and skills exchange between the three parties (see Figure 2).

We recognize that the implementer has the possibility to engage consultants from multiple sources for different tasks within the project. To simplify the discussion to its basics, and because our case evidence did not include that situation, we will assume a single consultant source.
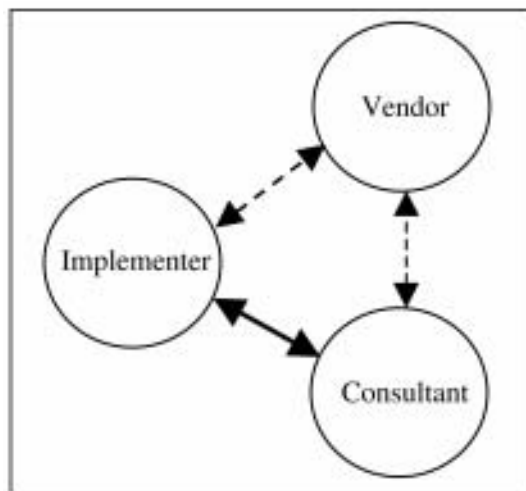

FIGURE 1 Implementation relationships: Implementer–Vendor–Consultant.

FIGURE 2 Knowledge and skills transfer.

2.2. Agency Theory

The argument we develop is rooted in agency theory (Eisenhardt, 1989; Jensen, 1983; Ross, 1973). The domain of agency theory (see Figure 3) is relations that mirror the basic agency structure of a principal and an agent who are engaged in cooperative behavior, but have differing goals and differing attitudes toward risk. In the case of an ERP implementation, the principal is the implementer and the agent is the consultant.

   Agency theory addresses the problems that can occur in agency relations. These problems can be seen as the result of three characteristics of the agency relation: goal differences, risk tolerance differences, and information asymmetry (Eisenhardt, 1985). The first general problem is differences in the goals of the principal and the agents. Agency theory acknowledges that, at least some of the time, organizational parties act opportunistically (i.e., on the basis of self-interest). Therefore, principals must recognize that agents might engage in opportunistic behavior at the principal's expense.

   Secondly, principals and agents may have different tolerances toward risk. In the context of an ERP implementation, the question would be, who should shoulder the responsibility of correcting a failed effort? Stated slightly differently, would the agent be willing to forgo payment if the implementation failed? Often it is assumed that agents are more risk averse than principals but this is not always the
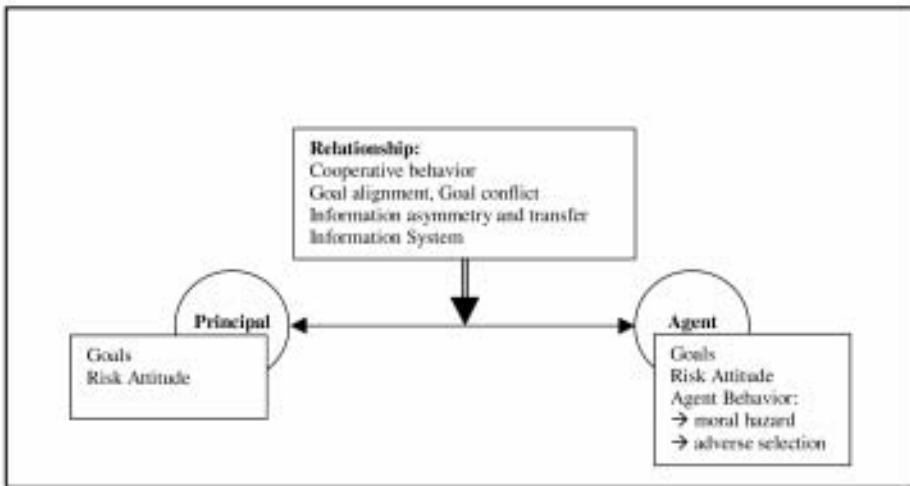
FIGURE 3 Agency theory.

case. Differences in willingness to assume the risk inherent in a given project can make it difficult to craft an agreement acceptable to both parties.

Information asymmetry is a critical component of agency theory. There are two general types of information that is not known equally by both sides: information that everyone would like to share and information that one or the other party might prefer to hide. As examples of the first kind of information, the principal may know more about subtle business requirements than the agent, and the agent may know more about potential technical configuration complications. As examples of the second kind of information, the principal may know more about his willingness to pay high fees to the agent if necessary, and the agent may know more about deficiencies in his skill profile, or ways in which he cut corners in carrying out the project. Often discussions of information asymmetry tend to paint the agent as concealing information that is potentially damaging to principals. But principals can conceal information that is potentially damaging to agents as well. For example, principals could conceal unusual organizational strains that would likely make the agent's job more difficult, until the agent had actually agreed to the arrangement.

From the principal's point of view, there are two types of agent opportunistic behavior that could be detrimental. The first, adverse selection, refers to the misrepresentation of ability by the agent. The second, moral hazard, refers to the fact that the agent may not act as diligently as expected in carrying out the will of the principal. Finally, an important proposition of agency theory is that better ISs can curb both kinds of agent opportunism and provide the principal with better control. ISs in this sense should be broadly defined to include computerized as well as human information sources.

Much of agency theory focuses on devising appropriate control strategies to minimize moral hazard. There are two basic control strategies: behavior-based and

outcome-based. Both rely on the principal's ability to evaluate the performance of the agent, either on a behavior-by-behavior basis or at the end of the project based on its outcome (Eisenhardt, 1985). The ease of evaluating either behaviors or outcomes is very dependent on the context. In addition, as Kirsch (1996) pointed out, the principal's ability to effectively evaluate the agent's behavior is severely limited by the principal's knowledge about the task.

2.3. Choice of Control Strategy for an ERP Implementation

Most organizations starting out on an ERP implementation project only have limited knowledge and skills available that are necessary to conduct and control an ERP project. At first glance an outcome-based control strategy may therefore appear more suitable for this type of undertaking. But there are several issues that need to be considered with respect to an outcome-based control strategy for ERP implementations.

Many consultants may not be willing to have their compensation purely based on the outcome of an ERP implementation project, because outcomes, especially business-related ones, may only be partially under their control and only partially related to the system implementation. This could pose a risk that is unacceptable for the consultant. In addition, the consultant may not be willing to wait until long-term outcomes become evident.

From the implementer's perspective, ERP implementation failures can have severe consequences to the organization as a whole (Davenport, 1998). Therefore the organization may not be well advised to wait for the outcome, which may be a negative one and not reversible. In the end, the implementer still takes a great risk, which cannot be transferred to the consultant. Consequently, a behavior-based control strategy may be the less expensive choice, at least for key areas of the project. This poses a problem for the many organizations whose initial knowledge is limited. Many may feel that their only option is to carefully choose a consultant with a strong reputation for knowledge and credibility, and then to trust that consultant to help them gain the needed knowledge as rapidly as possible.

3. THE MODEL: IMPACT OF CONSULTANT INVOLVEMENT AND KNOWLEDGE TRANSFER ON PROJECT OUTCOMES

Figure 4 shows the proposed conceptual framework for how the involvement of consultants and the implementer's level of knowledge affect consultant behavior and ultimately project outcomes. The degree of knowledge held by the ERP implementer about project leadership and management, system customization and administration, as well as technical knowledge, determines which additional knowledge and skills have to be obtained using a consulting service.

Thus the implementer's knowledge is a determining factor of a consultant's involvement. This knowledge also enables the implementer to more effectively monitor and control a consultant's behavior (Kirsch, 1996). The more control an imple-
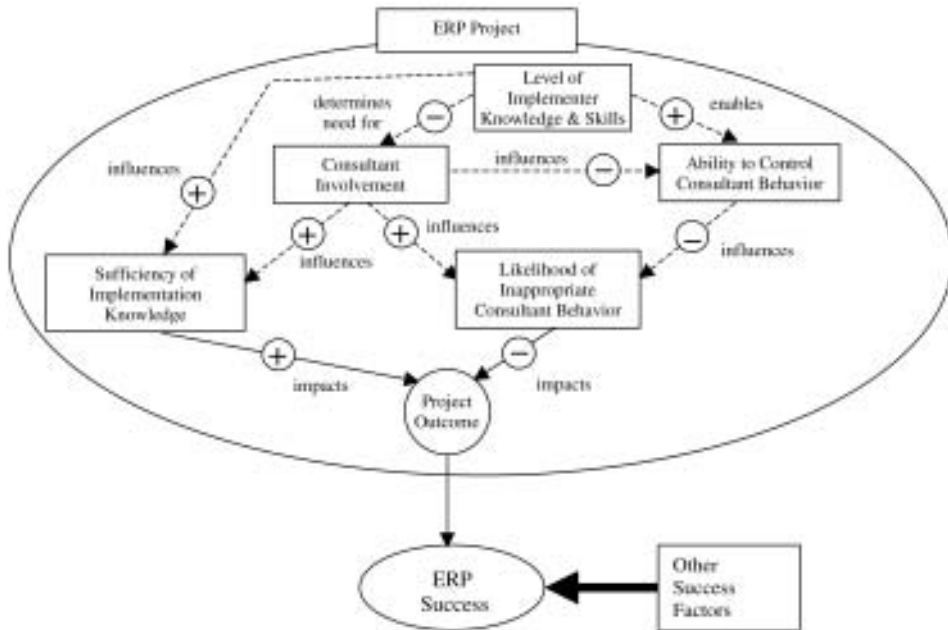
FIGURE 4 Knowledge, involvement, and consultant behavior.

menter has and the less involved a consultant is, the lower the risk of inappropriate consultant behavior, leading to undesirable project outcomes.

Within the concept of "involvement," it is important to distinguish between the (a) the level of involvement and (b) the roles the consultant assumes. The level of involvement reflects the number of consultants working on the project and the length of their assignment. The role reflects the primary tasks the consultants have to fulfill. The role can range from purely technical implementation tasks to strategic project planning and management tasks. We see three main roles a consultant can assume. First, the role of project planner or manager; second, the role of a mentor or trainer; and third, the role of a technical implementation assistant.

As the framework suggests, the role a consultant is permitted to assume has an additional influence on the degree of control an implementer has over the consultant. For example, if the consultant takes on project management responsibilities, then the implementer has less ability to control consultant behavior than if the consultant would only be used to complete technical tasks, assuming the level of involvement is comparable in both cases.

The likelihood of inappropriate consultant behavior is decreased by the implementer's ability to control the behavior of the consultant, but increased when the consultant takes on more managerial/strategic roles. Although this means that excessive consultant involvement can be dangerous, insufficient consultant involvement can also be dangerous if the implementer does not have sufficient knowledge and skills. In other words, an increased level of involvement has both a negative

and a positive influence on project outcome. This means that the involvement needs to be well balanced.

In addition to concerns about controlling consultant behavior, it is also important to consider the level of knowledge that will remain in the organization after the consultants complete their tasks. An organization has to assess which types of knowledge and skills are needed on a long-term basis to support the ERP system. This knowledge then has to be transferred in time into the organization to be available in-house when the consultants leave.

4. EVIDENCE FROM CASES

We illustrate the framework described earlier by using examples taken from an exploratory study. This study was not specifically focused on project management issues, but instead was aimed at identifying factors that contribute to ERP success in general. Although the issues pertaining to project management clearly emerged from the interviews, they were addressed with varying focus and varying depth in each interview. Nevertheless, the cases provide some interesting evidence to illustrate the proposed framework described earlier.

The study included 18 interviews with 21 CIOs and ERP project managers from 12 different organizations in the United States and Europe. The interviews were semi-structured and most questions had an open-ended nature. Given the lack of focused attention to project management issues in the interviews, the case examples should be viewed as opportunistic, anecdotal evidence that contributed to the generation of the conceptual framework, rather than confirmation of the framework.

Relevant information from cases regarding the implemented software product, internal IT resources, consultant involvement, project team and user training, and project outcomes are summarized in the Appendix. The identities of the participating organizations have been disguised for this article.

4.1. Adverse Selection

Adverse selection refers to the misrepresentation of ability of the agent. In the interviews with the 12 organizations in our study, interviewees in 9 organizations referred to the abilities displayed by the consultants. Five of these 9 organizations experienced misrepresentations of ability by the consultants. For instance, the project manager of LightCo mentioned that whereas some consultants were good, most were learning by doing. This was corroborated by the CIO of FastRestaurantCo, who said: "The consultants learned a lot from us."

The CIO of TissueCo was disappointed with the skills of the consultants working on his project. He expected more guidance from them. The project manager of RetailCo reported that the consultants often had questionable skills. Although the project managers of TransCo were satisfied with the knowledge and skills of the consultants from the ERP system vendor, they mentioned that third-party consultants often learned more from the implementation than they contributed to it.

4.2. Moral Hazard

Moral hazard refers to the fact that goal discrepancies may result in actions on the part of the consultant (agent) that are not in the best interests of the implementer (principal). Ideally the principal would like the agent to act "as if he were the principal;" that is, with the same goals as the principal, albeit perhaps with more knowledge. But because the incentives are necessarily different for the agent and the principal, this will not always happen. Moral hazard does not necessarily mean that a consultant showed unethical behavior, such as consciously producing substandard work results, working on unrelated tasks, or billing the implementer for activities that were not performed. A moral hazard may also be related to the incentive structure motivating the consultants. For example, although implementer and consultant could both have the goal of successful implementation, the consultant might be less intensely motivated to do whatever was necessary to achieve success. Moral hazard was evident in three of the cases.

CookieCo initially put their consultants in charge of project leadership and management. However, early on, CookieCo management recognized that the project was not proceeding as desired. According to the CookieCo's project manager, the consultants were not goal-driven enough and did not put in the needed effort. Eventually the consultants were relieved from their leadership and management role and just helped with the technical realization of the project.

Whereas CookieCo had the knowledge in-house to detect the undesirable behavior by the consultants, PumpCo did not. At PumpCo this undesirable consultant behavior was not revealed in time. Several instances of questionable advice regarding project management were given to the PumpCo project staff and users. For instance, the consultants managing the project recommended training to be marginal, testing to be neglected, and set an unrealistic timeframe. As a result, PumpCo encountered severe problems in the first months of operation, including a shutdown of production for almost a whole month. It turned out that the consulting company had underbid their contract with PumpCo and therefore seemed to be mainly interested in finishing the project as soon as possible without losing too much money. This was apparently the explanation for the short timeframe and the lack of training and testing.

In the case of RetailCo the project manager revealed that consultants wrote bills for activities that were never performed, which eventually led to a decision not to give consultants any management roles in future projects. Although this last example is perhaps the most blatant example of a difference between the goals of the consultant and the implementer, the other two examples illustrate that differing incentive structures can have an impact even when no overtly unacceptable actions are taken by the agent.

4.3. Knowledge, Consultant Role, and Consultant Behavior

To achieve a positive project outcome it is important to avoid undesirable consultant behavior, as described earlier. We identified two factors that influence the con-

sultant's behavior. The first factor is the ability of the implementer to control the consultant's behavior. The second factor is the consultant involvement (see Figure 4). We see the knowledge an implementer possesses as a determining factor for the involvement of a consultant, as well as the ability of the implementer to control a consultant's behavior.

The more the consultant becomes involved in the project, in particular in its strategic aspects, such as project leadership and project management, the more opportunities there are for a consultant to exhibit undesirable behavior. Even if an implementer has a relatively high level of knowledge in-house, he decreases his ability to control the consultant's behavior by turning over project leadership and management roles to the consultant.

In the case of CookieCo, initially the consultants not only helped with the technical realization of the project, but also had project leadership and management functions. CookieCo has a large IT department with a variety of knowledge and skills and also established an intensive training program for project team members and users. We see the internal knowledge held by CookieCo's IT department as one reason why CookieCo was able to realize that the consultants were not managing the project in the best interest of the organization. However, it probably took longer to recognize this because the consultants were initially in charge of managing the project. Once CookieCo took internal control of the project management and relegated the consultants to only technical realization roles, the project progressed more satisfactorily. It is now considered a clear success by the project manager.

PumpCo, in contrast, only has a small IT group and a limited set of knowledge and skills in-house. The consultants helped with the technical realization as well as influencing the project management by giving advice regarding the timeframe of the project, training, and testing. It appears plausible that the inability of PumpCo to detect the inappropriate behavior was a combination of the lack of knowledge within PumpCo and the fact that the consultants were involved in the project management. As the project manager stated: "Part of the problem was that we did not know which questions to ask." As it turned out, the guidance provided by the consultants was not in the best interest of PumpCo.

At RetailCo consultants were not used for project management purposes after the moral hazard experience reported earlier. In addition RetailCo emphasized training internal staff and bringing knowledge in-house. With the current set of knowledge and skills internally available, the need for consultants is overall reduced and limited to the role of helping with specific aspects of the technical realization. Because the implementation is well understood internally, it is also relatively easy for RetailCo to evaluate and control the consultants' behavior.

4.4. Knowledge Transfer

In five of the cases in our study, knowledge transfer is explicitly mentioned as an important factor for the success of the implementation. The project managers from TransCo reported that significant learning and knowledge transfer occurred during the project. It was part of the project strategy to leverage internal skills and

transfer and retain knowledge within the organization. This was viewed as one of the keys to success by the project management. The project manager of LightCo concluded, "Let the guys who learn by doing be your own people [and not the consultants]." He also realized that transferring and retaining knowledge into the organization was a big effort, but essential. He admitted that the learning curve was initially underestimated.

The organizations used different approaches to train and mentor their staff. The most common training approach was to train key users and key project team members, who then established an internal training program. This is also referred to as the "Train the trainer" approach. This approach was explicitly mentioned by six of the organizations. The training of users was often decentralized and responsibility was given to the individual departments. Only one organization, PumpCo, had no significant training program. For this reason and the fact that almost all of the technical realization and even project management issues were handled by the consultants, hardly any knowledge was transferred from the consultants to the internal staff at PumpCo.

The project managers acknowledged, however, that due to the limited skills available in-house, the knowledge and skills provided by a consultant will be essential to the success of the implementation. TransCo suggested that vendor consultants appeared to be especially effective at knowledge transfer due to their strong technical knowledge and their close communication ties within the vendor organization. One project manager pointed to another organization in the same industry that failed using a "do-it-yourself" approach, but was later successful with the help of consultants. In addition, managers at LightCo pointed out that in some specific areas more consultant involvement, although expensive, could have saved time and resources by easing the learning curve.

5. CONCLUSION

According to agency theory, organizations implementing ERP systems and engaging consultants to fill in the knowledge gaps have to consider that organizational life is sometimes driven by self-interest. For the principal–agent relationship of an implementer and a consultant, this means that the implementer has to be able to control the consultants' behavior to curb opportunistic behavior.

Our model suggests that the key to ensuring desirable behavior is the knowledge possessed by the implementer. This knowledge enables the implementer to evaluate the consultant's behavior and also determines the level of involvement of consultants in the first place. It is obvious that the more knowledge and skills are available internally, the less dependent an organization becomes on consultants. But in the case of an ERP implementation, hardly any organization has all the necessary knowledge in-house.

Methodology and technical knowledge and skills needed during the implementation may well be provided by consultants. Some of this knowledge is only needed temporarily and does not have to be retained. The implementer has to be aware, though, that some of the technical skills, such as system administration, sys-

tem customization, and a good conceptual understanding of the system, are needed beyond the day of going "live." If not already present these skills need to be transferred into the organization during the implementation.

More critical from the point of view of avoiding inappropriate consultant behavior are the knowledge and skills needed to fill the strategic roles in an implementation project, such as project leadership and management. Although it is clear that an organization is better off if it has this knowledge in-house, what should it do if it does not? Related to a behavior-based control strategy, we see two options. The first option is to increase, before beginning the project, the implementer's internal knowledge and thereby limit the need for consultants, especially in strategic aspects of the project. This could be done by hiring appropriate people into the organization. Of course there is always the difficulty of finding these "appropriate" people.

The second option is suggested by agency theory, although we did not see it used in any of our case studies. This is to follow the suggestion of agency theory to purchase another "IS" to assist in evaluating the behavior of the consultants. In this case, the additional "IS" would be a second consulting firm, hired solely to give feedback on the first consulting firm's performance. This, of course, creates a more complex set of relationships between the vendor and the consultants, having its own set of problems. An additional consultant also incurs additional costs. However, it seems an attractive alternative to "hoping for the best," especially if it is made clear to all parties from the time of the initial discussions.

The transfer of knowledge clearly emerged as another key aspect in the relationship between implementer and consultant. This has implications on how organizations select an "appropriate" consultant. Expertise, experience, and costs are criteria commonly included in the evaluation of a consultant. The findings of this study suggest that organizations also need to take into account the willingness and ability of consultants to transfer critical knowledge to the implementer.

5.1. Limitations and Future Research

The research presented in this article has several limitations. First, the evidence was gathered only from implementers of ERP systems. This provides a biased view and the reader should also consider that opportunistic behavior can also occur on the side of the implementer. For example, if an ERP implementation failed due to problems that were entirely the fault of the implementer, that implementer might still publicly blame the consultant. Second, because the original study (and therefore the interviews) did not specifically focus on relationships between implementation partners, it did not elicit the same level of detail from all organizations on some issues that now appear to be interesting with respect to knowledge transfer in ERP implementation projects. One such important detail is the types of knowledge that are considered crucial for the parties involved in the project. Third, this article focuses purely on the relationship between implementer and vendor. In practice there may be multiple implementation partners or vendors involved, providing different parts of the system or different services. The other relationships suggested

in Figure 1 can also have an important influence on the outcome of an ERP implementation project and are worth investigating in future research.

More focused research efforts will be necessary to validate and refine the framework. We see this framework as a starting point to gain a better understanding of how to effectively involve implementation partners into large IS implementation projects.

REFERENCES

Davenport, T. (1998). Putting the enterprise in the enterprise system. *Harvard Business Review*, *76*(4), 121–131.

Deutsch, C. H. (1998, Nov. 8). Software that can make a grown company cry. *New York Times*, Sec. 3, 1.

Eisenhardt, K. M. (1985). Control: Organizational and economic approaches. *Management Science, 31*(2), 134–149.

Eisenhardt, K. M. (1989). Agency theory: An assessment and review. *Academy of Management Review, 14*(1), 57–74.

Haley, B. J. (1997). *Implementing the decision support infrastructure: Key success factors in data warehousing.* Dissertation, University of Georgia, Athens.

Jensen, M. C. (1983). Organization theory and methodology. *The Accounting Review, 58,* 319–339.

Jiang, J. J., Klein, G., & Balloun, J. (1996). Ranking of system implementation success factors. *Project Management Journal, 27*(4), 49–53.

Kirsch, L. J. (1996). The management of complex tasks in organizations: Controlling the systems development process. *Organization Science, 7*(1), 1–21.

Meta Group. (1999). *ERM solutions and their value* (Research Report). Greenwich, CT: Author.

Ross, J. W. (1999, September/October). The ERP path to integration: Surviving vs. thriving. *EAI Journal, 1*(5), 58–63.

Ross, S. A. (1973). The economic theory of agency: The principal's dilemma. *The American Economic Review Proceedings, 63,* 134–139.

Sumner, M. (1999). Critical success factors in enterprise wide information management projects. *Proceedings of the Americas Conference on Information Systems, Milwaukee*, 232–234.

Zeitz, W. A. (1996). SAP R/3: Dream or nightmare?: Don't jump on the SAP bandwagon. *Computerworld, 30*(5), 101–103.

Zmud, R. W. (1980). Management of large software development efforts. *MIS Quarterly, 4*(2), 45–55.

APPENDIX

Summary of Case Observations

The following table summarizes relevant information from the 9 cases in which interviewees referred to the abilities displayed by the consultants.

Table A1: Case Observations

Case/ Industry/ Revenues/ IT Resources	Vendor/ Components	Consultant Involvement	Training	Adverse Selection	Moral Hazard
1: LightCo Manufacturing $1 billion Medium size IT group	Oracle Finance Manufacturing	Limited involvement of consultants.	Training internal people to retain the knowledge within the organization.	Some consultants were good, but most were learning by doing.	Not observed.
2: FastRestaurantCo Food Industry $1 billion Medium size IT group	Oracle Finance Logistics Human resources	Change from 'Big 5' consultant to local and more technology-oriented consultant. Strategy effort should come from within the organization. Use of consultants for technical tasks.	Training program for project team and users using the "Train-the-Trainer" approach.	The consultants learned a lot from working on the project.	Not observed.
3: TissueCo Manufacturing $ multi-billion Large IT group	SAP R/3 Finance Materials management	Only a few consultants from a single consulting service. Finding skilled consultants, especially for a newly released product was a challenge.	No information available.	Disappointment with skills of the consultants working on the project. Expected more guidance from the consultants.	Not observed.
4: RetailCo Retailing $ multi-billion Large IT group	Tesseract Human resources and payroll	After initially involving consultants in project management, consultants only aided with the technical realization.	RetailCo emphasized training their own people versus using consultants.	Consultants had questionable skills.	Unjustified billings from the consultants for work that was not performed. This incident led to the decision not to involve consultants in management roles in future projects.

(continued)

Case/ Industry/ Revenues/ IT Resources	*Vendor/ Components*	*Consultant Involvement*	*Training*	*Adverse Selection*	*Moral Hazard*
5: TransCo Manufacturing $ multibillion Large IT group with wide variety of key skills available internally	SAP R/3 Complete suite of modules except for distribution and human resources	TransCo used mainly the consulting services offered by the ERP vendor. A few outside consultants were used occasionally to fill the gaps, but had often insufficient skills. The consultants were mainly used to aid with the technical realization of the system.	The project management emphasized leveraging internal skills and training project team members as well as users. Decentralized training using the "Train-the-Trainer" approach.	Satisfied with knowledge and skills of consultants from the ERP vendor, but third-party consultants often learned more from the implementation than they contributed to it.	
6: CookieCo Food Industry $1 billion Large IT group with a variety of skills and project experience in-house	SAP R/3 Materials management Production planning Finance Controlling Sales and distribution	The consultants initially had a project leadership and management role, but were relieved from this role during the project.	Extensive and decentralized training program.	Not observed.	Project was progressing as desired with the consultant in project management roles. Eventually, consultants were relieved from management roles and only used for the technical realization.
7: PumpCo Manufacturing $100 million Small IT group and small internal project team	SAP R/3 Finance Materials management	Consultants were used for technical realization, but also had influence in terms of project management decisions such as training and testing.	Minimal training of project team and users. Hardly any knowledge was transferred into the organization.	Not observed. *Note:* The European consultants had excellent technical skills, but were lacking some American business knowledge and in one instance communication problems arose due to limited language skills.	Several instances of questionable advice regarding crucial project management issues (i.e., training and testing). Consultants undersold themselves and seemed to be mainly interested in finishing the project.

Table A1: Case Observations (Continued)

Case/ Industry/ Revenues/ IT Resources	Vendor/ Components	Consultant Involvement	Training	Adverse Selection	Moral Hazard
8: BottleCo Food industry $ multibillion Large IT group with wide variety of key skills available internally	SAP R/3 Finance Materials management Controlling Production planning	Consultants have to be experienced and should not be engaged on a long-term basis. The internal project team needs to become self-sufficient.	Early and extensive user training.	Some consultants lacked experience	Not observed.
9: TextileCo Manufacturing $500 million Medium size IT group	Considering SAP R/3 Finance Manufacturing	Outside help should be kept to a minimum and knowledge needs to be transferred quickly to the internal staff.	Not observed.	Not observed.	Not observed.