PARTNERING FOR KNOWLEDGE:

A LEARNING FRAMEWORK FOR UNIVERSITY-INDUSTRY COLLABORATION

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ABSTRACT

This paper addresses the important strategic issue of successful knowledge transfer in University-Industry strategic alliances. A learning framework for successful University-Industry collaboration is developed and detailed. Building on established research and experience, a learning perspective is introduced that is contingent upon the nature of knowledge. Background on learning, knowledge, strategic alliances and University-Industry collaborations is given. Decisions regarding the approach in the four stages of alliance development are discussed as related to the tacit to explicit continuum of knowledge characteristics.

The University-Industry Partnership Dream. Washington University and Monsanto have had a successful win-win partnership for innovation and learning since 1981. Monsanto, with an interest in developing and commercializing pharmaceuticals, partnered with the Washington University Medical school to provide basic research grants for university research. 40 percent of the $2-9 million per year grant partnership has gone to assistant professors, 35 percent to associate and 25 percent to full professors. For providing this grant program, Monsanto gets the right of first refusal for the licensing and development of new innovations for which it provided research support. Both sides agree that this has been a win for all involved. (The University-Industry Research Collaboration Initiative, 2001)

The University-Industry Partnership Nightmare. Boots Co PLC entered into a research partnership with University of California-San Francisco regarding the drug Synthroid. While Boots expected the research to support that there were no bioequivalents, the study instead showed that cheaper medications were nearly identical and that $356 million in health-care costs could be saved using the cheaper drugs. This prompted Boots to take action to discredit the research it had originally supported. (King, 1996)

Knowledge is Strategically Vital

It is becoming increasingly apparent and accepted that the discovering, developing and leveraging of knowledge is a key, if not the fundamental key, to sustainable competitive advantage in business (Conner and Prahalad, 1996; Hamel, 1991). Strategic leaders have three basic choices when it comes to discovering, developing and leveraging knowledge—do it all internally, get it done externally or some combination of the two.

Strategic alliances have received massive attention as a mechanism for external sourcing of knowledge innovations. Most of the attention has been on the business to business partnerships. Increasingly, leading firms are turning to partnerships with the universities for knowledge. And it is no wonder. Research universities are a vast storehouse of knowledge and have immense research know-how and knowledge discovery and development capabilities.

But, just how to successfully execute these partnerships is still a strategic question that begs for answers. Recently, Chairman of the Board and CEO Hank McKinnell of Pfizer Inc. and President Nils Hasselmo of the Association of American Universities, co-chaired the Research Collaboration Initiative and published a report specifically focused upon University-Industry partnerships (University-Industry Research Collaboration Initiative, 2001). This was one of the early national attempts to spark a dialogue about how to successfully design and execute these partnerships.

Our purpose is to aid in this quest by developing and detailing a learning framework, contingent upon the characteristics of knowledge, for successful university-industry partnerships. Based upon the academic literature, our research and practical experience, this article focuses upon the decisions in each of the four stages of the university-industry partnership that can help facilitate knowledge transfer. We take a learning perspective and recommend that the characteristics of the decisions should be based upon the tacit-explicit nature of the desired knowledge. This work should aid strategic leaders in their ability to make effective decisions while assessing, designing and executing these partnerships.

Partnering for Knowledge

As business leaders work to develop internal capabilities and resources, strategic alliances with universities have become an increasingly critical strategy for bringing in complementary

capabilities and resources from external sources. Industries including medical, pharmaceutical, automotive, optics, electronics, aerospace and biotechnology are turning to partnerships with the research university in order to transfer in critical knowledge. Recent partnerships for learning and knowledge transfer include a research effort between Purdue University and Intel toward developing optimization-based scheduling procedures for manufacturing, a project between Clemson University and CIBA Vision aiming to develop models to predict human performance in complex inspection tasks, and an agreement between the University of Texas-El Paso and Levi Strauss to develop a closed-loop production-control algorithm and concomitant hybrid pull system for improving production (Martin-Vega, Seiford and Senich, 2002).

According to the Association of University Technology Managers, in 2001 alone, US universities had over $23 billion in research expenditures, filed over 7000 patent applications and executed over 3000 new licenses. In 1998, University-Industry partnerships resulted in 385 new product introductions and $33.5 billion dollars of U.S. economic activity was attributed to academic licensing supporting 280,000 jobs (The University-Industry Research Collaboration Initiative, 2001).

Why have these relationships been formed? Universities offer extensive access to a wide variety of research expertise and research infrastructure. Industry offers extensive access to a wide range of expertise in product development/commercialization and market knowledge. The University and Industry are not obvious direct competitors, and working together simply makes sense.

Yet, while the incidence of these partnerships has dramatically risen and the benefits of success are clear, the traditional difficulties seen in alliances and partnerships are present. These include difficulty forming inter-organizational trust and communication coupled with additional difficulties arising from the diversity of mission between university and industry.

For knowledge matters, this diversity in mission (and consequent resources and capabilities) is both the strength of the partnership and a main source of the conflict between the partners thus creating a diversity paradox.

On the positive side, the new knowledge created and the ability to bring it to market are the respective strengths of the University and Industry. The primary knowledge mission of the University it to create new knowledge. This has been the traditional culture of universities, and knowledge creation is valuable for its own sake, regardless of market implications. To encourage knowledge created in the university to be used for the public good, congress passed the Bayh-Dole Act of 1980. This act allowed universities to retain ownership of patents generated through federally funded research while requiring efforts to commercialize the results for the public good. This encouraged interaction with industry. Since then, the knowledge mission has expanded in a way that overlaps with the industry mission.

The Industry mission regarding knowledge has traditionally been very pragmatic. Industry executives are concerned with employing knowledge to solve immediate problems in order to maximize earnings and stockholder wealth. They view research and development as an investment in future products which will lead to future profits. Knowledge is a basis for profit and advantages over competitors as has been articulated in the knowledge based view of the firm (Grant, 1996).

On the negative side, this difference in mission creates misunderstanding, mismatched systems and cracks in trust between the parties. This has created serious questioning of the ethics of the relationships in general, the specifics of the deals in particular and backlashes against the results of the agreements. Recently, a consortium of universities including officials

from the University of California System, Cornell University and Michigan State University signed an agreement related to biotechnology and agriculture, to lobby university administrators to stop issuing exclusive licenses and to retain more rights for academics in the issued licenses to companies such as DuPont and Monsanto. The consortium cited the need to protect the public universities' traditional roles of benefiting the small and poor farmer (Kilman, 2003). This may very well be related to the struggles consistently encountered concerning issues such as intellectual property rights, the speed of research, and the appropriate amounts for licensing fees that we've seen in our research. Clearly, there are often breakdowns in relationships that are key to making these partnerships work.

While the university-industry partnership has a long history, the advent of proactive, formal efforts toward commercialization of University intellectual property is a relatively new phenomenon. Much is still to be learned about how to structure and run these partnerships to realize their potential. And as one executive noted in interviews "The greatest hurdle that must be overcome in an industry/university relationship is the prevalence in an academic environment to seek knowledge and find answers versus the drive in industry to efficiently bring a new product to market."

How to Increase the Chance of Success?

The rest of the article will address industry decisions that can foster successful university-industry (UI) partnerships related to knowledge transfer in the four stages of the partnership development. We develop and detail a contingent learning framework. Rather than framing these relationships in traditional business models such as arms-length transactions or one entity getting or giving intellectual property, UI partnerships are viewed as learning interactions and decisions are based upon the tacit-explicit characteristics of the knowledge to be transferred from one party to the other. The critical relationship is at the level of the individuals that represent the organizations. It is their situation at the interface and their successful cognitive learning that ultimately will facilitate or impede the successful transfer of knowledge.

This paradigm is useful to the strategic manager as it allows for thinking of the various stages of the partnership formation and guides decisions regarding resource allocations and partnership development.

To accomplish our objectives we will first briefly overview research that underlies the framework. Building upon this, we will secondly give important background information regarding the learning paradigm. Third we will describe and analyze the context of the partnering relationship ultimately focusing upon the interface between the university and industry partners. Finally, working through the stages of an alliance, we discuss a framework for characterizing decisions regarding both the physical and social context of the interface that support learning and knowledge transfer.

The Framework's Research and Experience Basis

The learning framework for university-industry partnerships was developed based upon the union of academic research and practical experience of the authors. After extensively reviewing the existing literature, 36 interviews were conducted with experienced industry and university representatives. The purpose was to gain a rich understanding of the university-industry relationships and to build a testable model of knowledge transfer between partners. Additionally, over 100 technology executives and managers provided survey answers regarding what led to successful transfer of knowledge from university partners. (The initial quantitative results of this survey are currently under peer review). Through these multiple methods we were

able to meld academic and practitioner experience to develop a framework regarding the characteristics of successful decisions in the various stages of UI alliance based upon the characteristics of the knowledge being transferred. Previously published research and the results of this work are integrated into the development and detailing of the learning framework.

The Learning Paradigm of UI Partnerships

Three underlying notions are important to understanding the successful transfer of knowledge from the University to the Industry partner.

The first is that people do the transfer. While we often speak of organization to organization 'learning', it is the boundary role persons (BRPs; sometimes referred to as boundary spanners; Inkpen and Currall, 1997) that are the true entities involved in the context of the transfer. Thus, learning is taking place between BRP's in what we call the knowledge interface.

Second, the 'knowledge' that is to be learned is made up of both tacit and explicit components (Grant, 1996; Nonaka, 1994; Polanyi, 1967). Tacit knowledge is that which is non-verbalized or even non-verbalizable, intuitive, and/or unarticulated. This would include the knowledge inside the head of the university researcher including such things as skills related to using the knowledge, know-how related to adapting the knowledge, understanding of variations from 'official' processes, unwritten rules of thumb for implementing or troubleshooting and how to look at data or unstated theoretical connections. On the other hand, explicit knowledge is articulated verbally or in writing such as written specifications related to technology, step-by-step procedures for carrying out a process, troubleshooting technology, documentation regarding quality control, and documentation regarding prior development of knowledge.

Third, it is important to understand that the context of the relational learning environment plays a critical role in effectively learning both tacit and explicit knowledge. Much of the knowledge in the University is wrapped up in the heads of the researchers or partially articulated in the form of research reports and journal publications. This knowledge must be effectively learned and further developed by the industry partner BRPs in order to ever use it for a product, service or process.

As stated above, the success of learning is impacted by the learning context in which the organizations interact. In particular, as Brown and Duguid (1991) emphasized, it is the ambient physical and social context of the learning environment that are the keys to learning valuable know-how, information, manner and technique. Knowledge is embedded in the use and practice of knowledge and in order to learn both the tacit and explicit components, appropriate and legitimate access to the physical and social contexts is vital (See also Lave and Wenger, 1991).

The physical context includes integrative mechanisms that create a degree of overlap of places and access to the knowledge. For example, UI partners may set up a variety of communications channels such as formal teams, face-to-face meetings between experts, and access to data via the web. Each will provide a different type and level of physical access to the knowledge.

The social context focuses upon the relationships between the partner boundary role persons. This includes trust building, learning each other's 'language' and understanding the needs and concerns of the other party. Of these, the issue of trust plays a fundamental role and how to build it becomes a key question.

Knowing these three things, how can the industry decision maker allocate resources to the social and physical context to effectively support knowledge transfer through learning? The answer is contingent upon the degree to which the knowledge is tacit vs. explicit.

The contingent factor for the decisions is the characteristic of knowledge and decisions regarding design, development/implementation and assessment of the partnership will vary depending upon the nature of the knowledge to be transferred.

For example, if the knowledge is largely explicit then it is likely that there will be tangible deliverables that can be specified in advance. It is also likely that the physical context will be more critical than the social context. An example of a project involving the transfer of explicit knowledge is having a university researcher design and synthesize a material that has particular properties specified by the industry sponsor. The university researcher uses his or her knowledge and expertise to create the material. What the sponsor receives, however would be a sample of the material and detailed instructions of how to make it, not an understanding of how to design it. The deliverables are tangible and usable by the sponsor with little or no additional involvement from the university researcher.

If the knowledge is largely tacit then it is likely that some of the deliverables will be intangible and difficult to describe in advance. It is also likely that the social context will be more critical than the physical context. An example of a project involving the transfer of tacit knowledge would be having a university researcher teach the industry researcher how to predict performance properties of a material based on its structure or composition. Such knowledge resides in the head of the university researcher and is based on his or her experience and intuition. Transferring to the industry researcher the ability to predict properties may involve a variety of activities such as identification of key compositional variables, creation of a mathematical model or set of predictive rules, use of analogies, documentation of examples, etc. Here the deliverables are more difficult to specify in advance. The project is likely to progress by means of a series of iterative interactions between the BRPs that either succeed or fail in increasing the industry researcher's ability to predict performance properties. The relationship between the BRPs will be very important.

Before discussing these decisions, it is useful to go deeper into the knowledge interface located in what we see as a 'knowledge chain'.

The Knowledge Chain

Figure 1 represents the knowledge chain. The knowledge chain depicts the key links in the creation and ultimate usage of knowledge in an inter-organizational partnership. As the figure shows, the knowledge is developed in these partnerships in a chain composed of three main links: the university link, the industry link and the link bringing them together, the knowledge interface.

The figure represents that the main knowledge flow is from left to right. (It should be noted though, that there is likely to be significant knowledge flow in the opposite direction that may or may not be part of the official partnership.) Knowledge that is developed in the university and is ultimately learned by (transferred to) by industry will be somewhere on the continuum of from an early to a late stage of development. This corresponds with the increasing percentage of the explicit nature of the knowledge as it is developed.

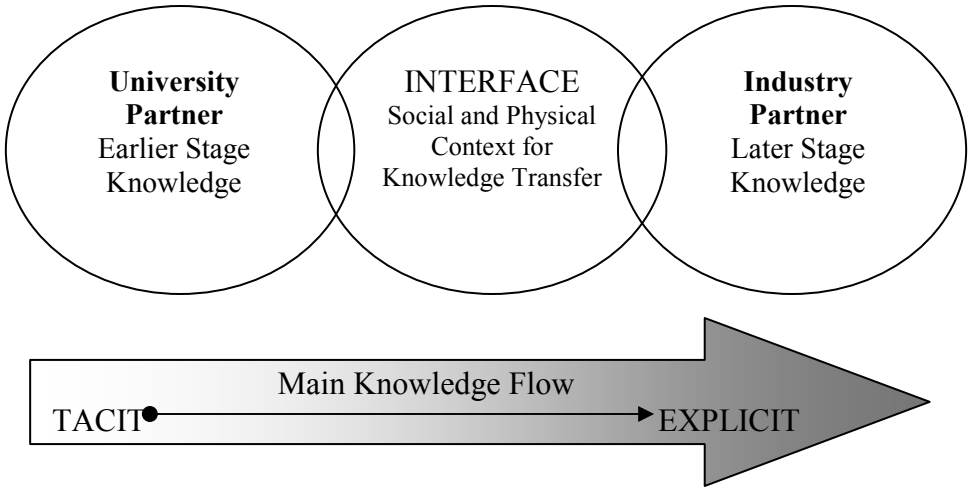

Figure 1: The University-Industry Knowledge Chain

Generally the university discovers new knowledge, forms theory and develops concepts from this theory. The concept is handed off at the interface and further developed by industry to the point at which the concepts become reality in the form of a product, service or process. Knowledge can be thought of as moving through a life cycle of creation, mobilization, diffusion and commoditization where it becomes increasingly explicit (Birkinshaw and Sheenan, 2002).

The figure also indicates there are key players as the links at the ends of the chain: the research university and the industry partner.

The Key Player Links

The research university is organized in a loose, flat structure with a great deal of internal diversity. This diversity includes both knowledge subject matter and focus of the individual faculty members. Inside, there are three main boundary spanner groups involved in UI partnerships including researchers, resource providers and research support.

Researchers include the faculty member who plays the triple role of research, teaching and service and the graduate students and post doctoral fellows who generally aid the faculty member and often execute a great deal of the research. These are the primary drivers of the research execution and design.

Resource providers include administrators of grants and those who have an interest in seeing certain types of research be conducted. Often funds are available and granted for approved research proposals.

Finally, there is the research support administration including the office of sponsored programs (OSP) and offices of technology transfer (OTT). Sponsored programs offices act as liaisons between joint research programs of university faculty and staff and outside organizations. Technology transfer offices administer the agreements related to intellectual property and its usage.

Traditionally, university knowledge creators have a variety of outlets for their research that do not include commercialization. These include academic journals, books and conferences.

Increasingly, university researchers either work themselves to create new ventures outside the university or develop their work in business incubators supported by the university. Several major employers in the San Francisco Bay area that were spawned with university OTT

involvement include Sun Microsystems, Cisco systems, Chiron, and Genentec (Graff, Heiman and Zilberman, 2002).

Relative to the University, industry organizations have lesser diversity in either mission or knowledge subject matter. The focus on the business mission is generally more evident. None-the-less, industries generally have boundary spanner roles that parallel those described above for universities. The key boundary spanners involved in UI partnerships include industry researchers, external technology managers/product managers and legal personnel.

The industry researcher is often focused upon developing marketable products/services or processes useful in the ultimate marketability of products or services. While they may be involved in some degree of new knowledge creation, the question of marketability is continually a predominant presence.

External technology or product managers are those that play the role of manager of joint programs of UI partnerships. While their roles vary from firm to firm, they often manage multiple relationships between their organization and universities (as well as industry partners).

Finally, the legal personnel work to set up the legal frameworks for the UI partnerships and address the legal issues of intellectual properties.

In the absence of a partnership with universities, knowledge comes from several sources to the industry organization. These include information published in academic journals, internal research and development, partnerships with other industry players, arm's length transactions and new employees who are recent university graduates. While research is conducted internally in industry, the character of that research is different due to the threshold of acceptable work being based upon the market.

Rather than the discovery focus of the research university, a great deal of research takes place that focuses on repeating a similar outcome thus supporting the reliability of a product, service or process. Additionally, a great deal of emphasis is placed upon development that aims at satisfying user needs. While the issue of practicality for the consumer is often a distant potential in the university, it is of primary import in industry.

The Knowledge Interface Linkage

The knowledge interface is the linkage between the University and the Industry partner boundaries. It is here that the work related to selecting partners, negotiating, structuring, implementing and assessing takes place that will ultimately facilitate or block the successful knowledge transfer. Thus, it is here that that the diversity of the two organizations comes together and allows both learning to take place and conflict to arise.

As implied above, the knowledge interface develops in stages. These stages are similar to those of strategic alliances in general but have the specific flavor of UI partnerships. Each will be described in general following a discussion of how decisions in each will ultimately impact the successful learning and thus successful knowledge transfer from U to I.

The Stages of Partner Development and Decisions to Support Learning

Strategic alliances develop in stages and the University-Industry partnership is no exception (for different stage conceptualizations see Doz and Hamel, 1998, Dent, 1999 and Harbison and Pekar, 1998). Common stages include assessment, negotiation and design, implementation, and alliance assessment and termination. Among the many decisions made at each stage, there are those that can facilitate the learning objectives of the partnership. The

character of these decisions can influence the ultimate outcome of the partnership and the degree to which knowledge is successfully transferred.

Table 1 presents a framework representing stages of partnership development and the key learning questions to be asked in each. Stage 1 focuses upon knowledge assessment and Stages 2-4 focus upon the character of the decisions that are contingent on the tacit-explicit nature of the knowledge to be transferred.

Stage 1: Partner Assessment and Selection	Assess the degree to which knowledge is tacit or explicit		
		Late Stage/Explicit	Early Stage/Tacit
Stage 2: `Alliance Negotiation and Governance	Social	Develop trust between administrators	Develop trust between administrators, knowledge holders and key research personnel
	Physical	Choose structure that allows for efficient exchange	Choose structure that allows significant physical overlap
Stage 3: Alliance Management	Social	Maintain contact and monitor progress with administrators/managers	Continuous building of relationships between administrators, knowledge holders and key research personnel
	Physical	Build efficient exchange channels	Build thick exchange channels
Stage 4: Assessment and Termination	Social	Assess the relationship between administrators/managers for sufficient trust and efficiency	Assess the relationships between all administrators/managers, knowledge holders and key research personnel for adequate development of trusting relationships.
	Physical	Assess the communications channels for efficiency	Assess the thickness of the communication channels

Table 1: The Learning Framework for University-Industry Collaboration

Stage 1: Partner Assessment and Selection-assessing the characteristic of knowledge

The decisions related to learning at the first stage focus upon assessing and selecting both knowledge and a qualified university learning partner.

The key question to be answered regarding knowledge is: To what degree is the knowledge explicit or tacit? The answer will guide the future stages of the partnership. There are multiple questions that can facilitate this assessment including:

- Can the knowledge be used 'as is'?
- Has the knowledge been articulated in journals?
- Have the results been replicated?
- Are there prototypes?
- Are supporting data available?
- Is the development needed to bring the knowledge to market or use minimal?
- Is the need for the participation of the researcher minimal?

Strong 'yes' answers indicate the knowledge is toward the explicit end. Qualified answers or strong 'no' answers indicate the knowledge is mixed or highly tacit. Selection depends upon the industry partner's strategic objectives.

The key question regarding the university partner is: to what degree is the partner capable and willing to support a learning relationship? Questions that facilitate this assessment include:

- Do they have experience with external partnerships?
- Have you worked with them before?
- Do they have the needed support structures in place?
- Are their research faculty interested in these agreements?
- Is the university administration interested in these agreements?
- Do they have good reputation for partnering?

Again, strong 'yes' answers indicate the partner has the potential to be an effective learning partner. Qualified answers or strong 'no' answers indicate the need to assess the firm's willingness to fill in the gaps related to capabilities and/or work to change the attitudes of the key decision makers in the university. Again, strategic objectives play a key role. In the next stage, decisions about how to structure the relationship and who plays what role in learning become the focal areas of interest.

Stage 2: Partnership negotiation and structuring-design

This stage involves the negotiating and structuring of the partnership. It is at this point that we focus in upon the social and physical context at the knowledge interface and the decisions become contingent upon the nature of knowledge. The critical decision question is: What can be done through negotiation and structuring that will support learning?

Social Context. Interviewed technology managers consistently indicated that the negotiation stage is vital to the success of the partnership. At this stage, social context decisions focus upon developing appropriate trust. If the knowledge is highly explicit, it is important to develop a trusting, working relationship between knowledge managers including those in the administration of these agreements on both sides. To support this, clear expectations and procedures for how negotiations will be conducted and joint decisions made. Partners must feel

that negotiations are even handed. If the knowledge is tacit, not only do the knowledge managers need to be highly involved, it is important to involve the knowledge holders including key research personnel on each side. Because the knowledge is not fully separated from the researchers, they will play a vital role in the learning and developing a trusting relationship is critical. Expectations at these multiple levels should be discussed and clarified.

Physical Context. At this stage, physical context decisions focus upon developing and designing appropriate integrative mechanisms. If the knowledge is highly explicit, structures that provide for the minimum physical overlap between organizations are appropriate. These should provide for efficient exchange of knowledge and can be detailed in contracts and agreements. If the knowledge is highly tacit in nature, structures that provide for maximum physical overlap between organizations are appropriate. Rather than focus on efficient exchange, these focus upon the inefficient face to face, elbow to elbow learning that takes time, but is necessary for tacit knowledge to be learned. Agreements and contracts should outline these structures but not overly restrict the ability for overlap to be leveraged as needed.

Once these and other issues related to negotiation and structuring have been settled, the partnership moves on to implementation.

Stage 3: Partnership Management-implementation

At this point, the partnership begins. The decisions here take place in the day to day operations for enhancing the learning. The key decision question is: What can be done during implementation to facilitate learning?

Social Context. Building on the work in the second stage, the decision maker will want to support the growth and strengthening of the key trusting relationships. For explicit knowledge, managers and administrators should maintain contact and monitor the progress of the exchange. Each side will want to ensure they are doing all the agreed upon activities in order to demonstrate their trustworthiness. It is important to also ensure that the partner perceives that promises are being kept and that opportunities are not being taken by one partner at the expense of the other. In addition to the above, if the knowledge is more tacit in nature, resources should be provided to facilitate the relationship building between researchers. Researchers should be allowed the freedom needed to drive the transfer ahead and to develop a sense of each other's competence and goodwill.

Physical Context. Here, the focus is upon executing and improving the integrative mechanisms to facilitate learning. While the outline of the structure is developed in stage two, the 'on the ground' work is done during implementation. If the knowledge is highly explicit, assessing the current effectiveness of the BRP integrative mechanisms, including communication processes and physical exchange, is important. Methods should be established for how managers will communicate and act as liaisons between researchers on an as-needed basis. Additionally, if the knowledge is highly tacit, efforts should be made to create effective 'thick' communication mechanisms and to plan and execute both formal and informal interaction between holders of knowledge. These might include meetings between experts, working at one another's research facilities and informal social gatherings.

This process of implementation and evaluation should continue throughout the partnering until it is agreed that the knowledge has effectively been transferred. This leads to the final stage, assessment and termination.

Stage 4 Assessment and Termination-The dynamic nature of knowledge and bringing knowledge transfer to a close.

The final stage involves setting the stage for future successful learning partnerships. Here, the key question is: What can be done through assessment upon termination to facilitate future learning success?

Social Context. The social context focus is upon deciding what worked or not in developing appropriate trust. Additionally, it is important at this stage to identify what steps can be taken to maintain the relationships for potential future agreements. For the partnership with predominantly explicit knowledge, the assessment looks at the relationship between the knowledge managers. How well did these relationships develop? What increased or decreased the level of trust between these BRPs? What can be done to maintain these trusting relationships into the future? For those predominated by tacit knowledge, it is important to ask these same questions about researchers. To do this, the researchers should play an important part, and decisions to support maintaining these relationships into the future can be made.

Physical Context. Finally, it is important to decide how the physical context supported learning. For explicit knowledge, an assessment can be made of how well the structure of integrative mechanisms supported the transfer of knowledge. Were there unnecessary physical overlaps or ineffective communication mechanisms that were obstacles to knowledge transfer? What can be done in the future to improve the mechanisms? For knowledge that is tacit, the assessment focuses upon the appropriateness and effectiveness of the physical overlap. Was it adequate for true learning to take place? What can be changed in the future to improve its effectiveness?

Answers to the above questions help set the firm up for future success with both this and other university partners.

Conclusion and Additional Questions

This paradigm of contingent learning for developing successful UI partnerships can be used as a guide to making partnership decisions. It is born out of research and experience focusing upon successful and unsuccessful partnerships between universities and industry and strategic alliances in general.

Developing overall alliance capabilities has received a great deal of attention over the last decade. Developing partnering capabilities specifically for learning is an important step to gain access to a relatively underutilized vast knowledge storehouse and creation organization, the research university. Using a learning framework rather than a business framework to structure UI partnerships, particularly when tacit knowledge is involved, increases the probability of success.

Our research and experience supports that knowledge transfer is more successful when the social and physical environments are tailored to suit the nature of the knowledge, whether tacit, explicit or somewhere in between. This suggests that another aspect of the project, the legal agreement or contract governing the interaction, should also be tailored to reflect the nature of the knowledge being transferred.

This raises a provocative question as many companies and many universities start with a standard or boilerplate agreement regardless of the nature of the knowledge involved in the project. Some parties will attempt to negotiate modified terms and conditions but other will not. Perhaps some of the problems that companies and universities encounter in trying to set up a project are due to taking this “one size fits all” approach to the agreement binding the parties.

The obvious question is: would it make negotiations less contentious and improve the probability of success in the knowledge transfer partnership if the legal framework governing the rights and obligations of the parties also reflected the nature of the knowledge being transferred and was designed to support the appropriate social and physical environments for the project?

Projects that involve highly explicit knowledge look more like business deals or purchasing transactions and could be accommodated by a legal agreement that treats the parties as supplier and purchaser and addresses the deliverables and contingencies typical of such a transaction. Projects that involve highly tacit knowledge look more like teaching/learning relationships and probably could be better served by a legal agreement that would foster the trust and openness necessary for the success of the project rather than focusing on protecting of the rights of the parties in scenarios that are unlikely to occur. These additional strategic questions await answers.

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