

KNOWLEDGE INTEGRATION ACROSS ORGANIZATIONS: HOW DIFFERENT TYPES OF KNOWLEDGE SUGGEST DIFFERENT PRACTICES AND DIFFERENT "INTEGRATION TRAJECTORIES"

Rafael Andreu^a
Sandra Sieber^b

^{a,b}Information Systems Department,
IESE Business School, Spain
^aandreu@iese.edu
^bsieber@iese.edu

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Abstract

In this paper we establish a framework for analyzing knowledge integration across organizations from a corporate standpoint, pinpointing the challenges of a firm wishing to effectively integrate knowledge among its business units to improve its efficiency as a unique firm and its effectiveness through a better competitive positioning. Typical examples are those of a firm whose divisions benefit from better knowledge sharing in specific areas, or of a corporation which formed by acquiring a set of independent, albeit somewhat similar –for example because they operate in the same industry– firms. Such situations are not rare in today's business landscape and, further, more and more they give rise to knowledge integration considerations as the so-called "knowledge economy" progresses.

Keywords: knowledge integration, corporate knowledge, knowledge-based synergies.

Knowledge Integration across Organizations: How different types of knowledge suggest different practices and different "integration trajectories"

Rafael Andreu^a,
Sandra Sieber^a

^a Information Systems Department
IESE Business School, Spain
{andreu, sieber}@iese.edu

Abstract

In this paper we establish a framework for analyzing knowledge integration across organizations from a corporate standpoint, pinpointing the challenges of a firm wishing to effectively integrate knowledge among its business units to improve its efficiency as a unique firm and its effectiveness through a better competitive positioning. Typical examples are those of a firm whose divisions benefit from better knowledge sharing in specific areas, or of a corporation which formed by acquiring a set of independent, albeit somewhat similar –for example because they operate in the same industry– firms. Such situations are not rare in today's business landscape and, further, more and more they give rise to knowledge integration considerations as the so-called "knowledge economy" progresses.

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Suggested track: F - Integrating knowledge across organizations

1 Introduction and Motivation: Knowledge integration needs at the corporate level

In a firm, the role of the corporate level depends on how the different business units that compose it contribute to the company as a whole. Depending on this role, specific knowledge integration needs emerge. Thus, in a corporate environment in which inter-unit relationships are minimum because the corporation is conceived as a portfolio of businesses whose interdependency does not go beyond that of pure financial aspects, corporate level decisions need only a rather scanty knowledge sharing scheme. Knowledge integration needs are circumscribed to the interchange of a well defined set of rather structured financial "reports". In contrast, there are also corporate settings that

are much more demanding in terms of knowledge integration. For example, a firm that wishes to materialize scale economies (in purchasing, for instance), or a corporation that needs to make potential synergies in R&D real in order to preserve its competitiveness will need to be able to adequately integrate knowledge from different units in order to be able to compete effectively in the market.

As the above brief examples illustrate, specific knowledge integration needs in a corporation depend heavily on the specificities of the situation at hand, thus implying that the concrete actions to undertake in order to achieve good corporate results are highly contingent, not only because each firm has very particular “technical” conditions to face, but also because tradition, culture, learning capabilities and so on vary widely from firm to firm and even from business unit to business unit. As a consequence, one might think that very little can be said in general regarding the identification of the associated knowledge integration needs and the design of action plans to give adequate response to them. In this paper, we argue that a careful examination of the types of knowledge involved in any integration process may indeed throw some light onto managerial actions to be undertaken from a generic standpoint. Hence, the aim of the paper is to characterize different kinds of knowledge integration needs at the corporate level, based on the types of knowledge that are to be integrated. We do this starting from three well known classifications of knowledge, and inferring how strong a set of relationships is likely to develop among members of the organizations or business units that need to be integrated. This leads to the definition of different types of “integration trajectories”. These can be conceived as elements of a sort of “repertoire” or “toolkit”, which can turn out to be more or less appropriate to different kinds of corporate integration settings. In this way, organizational history, the existence or not of culture gaps or even clash among units in need of integration, or a strong common mission, condition the feasibility of a certain set of “integration trajectories”.. The development of relationships among organizational members or units implies, in turn, a need for learning, which may require more or less effort on the part of the individuals involved. This gives rise to a criterion to evaluate how tough the integration effort is going to be and consequently what sort of organizational accompanying measures have to be put in place in terms of, for example, incentive and compensation systems, or management systems in general.

The paper is organized as follows: In section 2 we provide a brief theoretical and conceptual background, focusing on what we think are the relevant knowledge types for the purpose of this paper. We also give a glimpse at some basic associated learning concepts and the possible role of technology-based support. Next, we introduce the concept of “learning trajectory” that we have developed in Andreu and

Sieber (2000), in order to be able to clearly define the “integration trajectories” construct. Section 3 introduces the idea of relationship building for the purpose of integration, and briefly justifies why focusing on how different knowledge types interact seems to make sense given the aim of the paper. Section 4 then proposes a framework for knowledge integration, develops the concept of “integration trajectories” and builds on the idea of exploration and exploitation applied to them. In section 5 we explore the issue of organizational fit as applied to integration trajectory “prototypes”, suggesting that different trajectory profiles may be more suitable than others in different organizational scenarios, as well as different types of technology-based support. Section 6 concludes and reflects on some directions for further research.

2 Theoretical and conceptual background. Some related research

Researchers have written extensively about knowledge and the nature of knowledge in a wide variety of theoretical fields. For the purpose of this paper, three distinctions among types of knowledge are of relevance. A first distinction is that between explicit or encoded and non-encoded knowledge. Encoded knowledge is fully explicit, conveyed by signs and symbols, and hence easily shareable (see Boisot, 1998, Nonaka, 1991, or Nonaka & Takeuchi, 1995). Non-encoded knowledge, understood as Polanyi’s (1962) “people know more than they can say” cannot be easily made explicit, and it may even be counterproductive for a firm to try to make it explicit, as this knowledge is more difficult to imitate, hence potentially allowing for knowledge-based competitive advantage (Connor & Prahalad, 1996; Grant, 1996). As Blackler (1995) or Sieber (1998) point out, tacit knowledge in organizations may be embodied (i.e., individual know-how), embedded (i.e., rooted in a firm’s routines, culture or top management schemes, and hence having a collective or context-dependent component), or embrained (i.e. possessed by an individual, who is not able to articulate it),

A second distinction that has to be taken into account is that between collective and individual knowledge (Connor & Prahalad, 1996; Spender & Grant, 1996; Spender, 1994). While the concept of individual knowledge is clear and does not lead to confusion, collective knowledge can be understood in different ways. Thus, knowledge that is deposited in a knowledge repository has been considered to be collective or public (Duncan & Weiss, 1979). On the other hand, collective knowledge has often been associated to shared knowledge.

Thirdly, researchers of both the economics¹ and managerial literature² distinguish between external and internal knowledge. External knowledge has value outside the firm, and therefore can be traded in labor or intellectual property markets. It tends to be rather technical and explicit, which makes it relatively easy to acquire, be it through internal training or simply by “hiring” it in the market (Becker, 1962). External knowledge does not lead to differentiation, although it is essential in any corporation, as some standard level is indispensable for competitive survival. In contrast, internal knowledge is idiosyncratic of a particular firm and refers to the particular organizational context. It acts as a sort of organizational glue that hold the organization together, giving it cohesiveness and sense of unity. It is therefore more valuable inside the organization than in the market, and is less subjected to imitation, hence being the critical source of sustainable competitive advantage.

As knowledge and learning are deeply intertwined, different types of knowledge require different ways, methods and actions of knowledge creation and sharing. Hence, while encoded knowledge can be deployed more effectively in a firm (and across organizations) using ICT tools, embrained knowledge transmission requires personal interactions and often deep comprehension. On the other hand, collective knowledge building efforts often require the involvement of many organizational members within a particular context, and so on. Our contention is that focusing on “adequate” learning processes, which lead to the creation and deployment of the “appropriate” mix of knowledge in a firm. Of particular importance is the adequate balance between external and internal knowledge, as a continuous lack of any of them leads to a firm’s failure.

One way of structuring these learning processes is with the identification of the most adequate learning patterns, which we called learning trajectories (LTs) (Andreu & Sieber, 2000). A firm develops the adequate mix of internal and external knowledge

¹ See Becker, 1962, Doeringer and Piore, 1971, and Williamson, 1981 for different approaches from an economic, human capital, and transaction cost point of view.

² For example, Porter, interviewed by (1999), distinguishes between “operational improvement”, understood as the incorporation of practices that would be good for any company, and “strategic positioning”, which he defines as the unique way of competing of a particular organization. In a similar manner, Edvinsson’s and Malone’s (1997) concept of intellectual capital is close to our concept of internal knowledge, although it has often been treated as a mixture of internal and EK. Already in 1957, Selznick’s “distinctive competence” implicitly incorporated the IK concept when he pleaded for the “institutional embodiment of purpose” and the protection of the organizational integrity as a concern of first importance.

when its members progress according to a right combination of learning trajectories. Understood in this way, a learning trajectory of an individual (acquiring encoded or non-encoded knowledge) is the evolution of his or her significance to the organization in terms of contributing external or internal knowledge to it (and in the process, collective knowledge is created).

When learning takes place in an inter.-organizational setting, the picture is a bit more complicated. Ciborra and Andreu (2001), for example, discuss knowledge sharing across organizational boundaries with an emphasis on how the so-called “learning ladder”, that models the learning process which turns generic resources into strategic capabilities. In that context it is apparent that sharing simple work practices is easier than putting distinct strategic capabilities to work effectively together. In a sense, we build on some of these concepts when introducing the notion of knowledge integration trajectory below.

3 A knowledge-based view of relationship building for integration purposes

Coming back to the central idea of this paper, our concern is how to respond to knowledge integration needs at the corporate level of a firm consisting of several business units or divisions. Such needs stem from the fact that corporate levels are created to exploit potential synergies among those units. Often a synergy has its origin on the possibility of improving the performance of the whole through an effective sharing of know how among units. For example, two divisions might exhibit different degrees of efficiency in performing similar if not exactly the same tasks. Considering the corporate level as a hub where knowledge can be effectively interchanged gives that organizational level one of its *raison d'être*.

For these reasons, one can conceive the corporate level as one where relationships among the firm's units or divisions are established with the purpose of achieving better overall results. At the end, though, such relationships are going to be built on relations among individuals or groups thereof belonging to different units. They will eventually be responsible for the adequate knowledge creation, transfer and deployment at the “right” place and time, and in the most effective way possible or feasible. This in fact means “putting knowledge in common in order to extract the combination most effective given the purposes of the firm”, which in turn means knowledge sharing and learning on the part of both individuals and groups in the firm –maybe even groups put together for exactly this purpose; i. e., implementing some concrete learning trajectories to facilitate

knowledge sharing and learning. During this process, different kinds of relationships emerge.

Depending on the type of knowledge involved, the resulting relationship may be more or less effective in terms of the associated knowledge interchange and learning. To illustrate this in Figure 1 we depict all possible combinations of the types of knowledge discussed in the preceding section. Each combination implies different kinds of relationships among individuals or groups of individuals likely to result from processes aimed at integrating the corresponding type of knowledge. Thus, for example, we suggest that individuals coming from different business units that are in the need of integrating external, individual explicit knowledge are likely to develop much weaker relationships or links among them than if they were involved in integrating internal, implicit collective knowledge. The very nature of the processes involved, as suggested in the figure, would cause this.

		Internal		External	
		Explicit	Implicit	Explicit	Implicit
Collective	Individual	Self-study (Internal monitor) Weak	Master / apprentice: Moderate / Strong	Self-study (External monitor) Very weak	Master / Apprentice: Moderate
	Collective	Structured Teams: Moderate	Teams: Very Strong	Structured teams: Moderate	Teams: Strong

Fig. 1. Different possibilities of knowledge integration needs and the associated resulting types of relationships among the involved individuals or groups

One interesting implication is that as a result, the effective degree of integration achieved among business units –and as consequence the degree of difficulty to actually achieve it–, from the corporate perspective, has thus to do with the types of knowledge that need to be shared. This, in turn, suggests that from an implementation standpoint the type of knowledge is a critical element of any design and planning process. This is to be explored further in the next section, where the “integration trajectory” concept is introduced as a way to make the implementation argument more operative.

The distinction between internal and external knowledge is particularly useful to characterize in more detail the kind of relationships associated with the corresponding integration processes. For example, assume that we have two units A and B with need

of knowledge integration at the corporate level, as is schematically depicted in Figure 2.

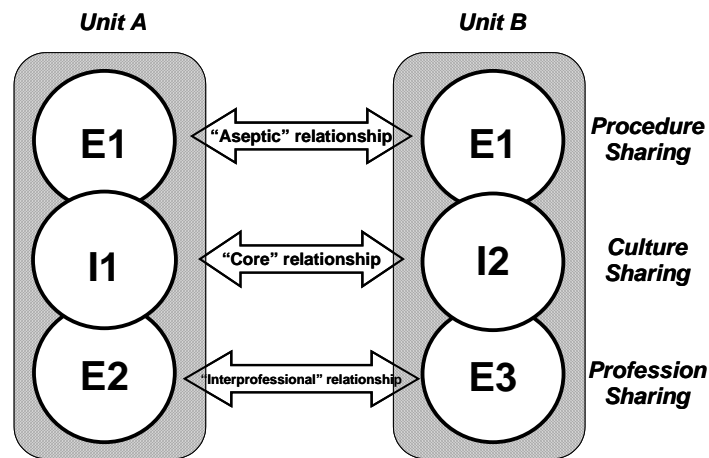


Fig. 2. Different integration relationships resulting from different knowledge sharing processes where internal and external knowledge are involved

Assume further that the “knowledge base” that unit A needs in order to operate contains two external pieces of knowledge, E1 and E2, and one internal, I1. Similarly, B needs E1, E3 and I2 (where E refers to external knowledge and I refers to internal knowledge). Without exploring all possible cases, it is clear that the integration of the different knowledge pieces will give rise to very different processes, each with its own characteristics and degree of difficulty –stemming basically from how hard the corresponding learning efforts will result eventually, which depends not only on how “compatible” the knowledge pieces to be integrated are, but also on the background, training and preparation of the involved individuals and groups. We characterize some processes in Figure 2 as an illustration. Hence, if the two units have a common piece of knowledge in their base (which we assume to be external in this example), their integration is likely to be rather easy, probably involving only details about how the same sort of procedures or know-how are used in one and another. We call this kind of integration process “procedure sharing” to emphasize precisely this aspect, and conclude that often it will result in a sort of “aseptic” relationship among the involved people (more so if the piece of knowledge is explicit, of course).

Similarly, the integration of two different pieces of internal knowledge can be also characterized. One would expect it to be more difficult and involving more fundamental concepts and ideas which in addition will be close to the core values of the units –

which justifies the “core relationship” name we use in the figure, to underline that culture sharing is really what this is about.

An intermediate case can occur when the pieces of knowledge to be integrated are external but not the same, as illustrated in the bottom part of the figure. Although without additional details it is almost impossible to say anything, one can expect individuals coming from different professional groups and traditions to be involved, thus giving rise to the idea of “interprofessional relationship” stemming from a process that we term as “profession sharing”.

Of course, each particular case is characterized by specific details of (a) both knowledge types and content, (b) the profiles of the persons involved and (c) the uniqueness of the organizational context at hand. Nevertheless we suggest that the type of analysis proposed, based on the configuration of the knowledge bases to be integrated, can be useful and shed light on the processes needed, and hence be a guidance for the design, planning and implementation process in each specific situation.

4 A framework for knowledge integration: Integration trajectories

With all the caution and carefulness that the specifics of each concrete situation deserve in order to avoid using generic, standard procedures to integration problems that are bound to be always situated, what we have just suggested in the preceding section can be used to propose a simple idea that even so might prove useful to plan and implement integration efforts of the sort discussed here.

For example, one can try to anticipate the kind of relationships that the integration process is bound to develop in a given organization (in fact, not only that: They are not only bound to develop, but probably they should develop in order to render the process more effective), and then plan and manage the implementation process accordingly, taking into account the relevant organizational variables in a wide sense.

Assume for instance that for whatever one thinks that the best way to organize the integration process is to proceed from easy to difficult, trying to bring people on board as the process unfolds and individuals learn how working with others the integration can proceed in an almost natural way where people learn to put together increasingly more involved integration activities. This would be equivalent to draw an “integration trajectory” in the “knowledge map” representing the knowledge bases to be integrated, as we did in Figure 2 above. See Figure 3.

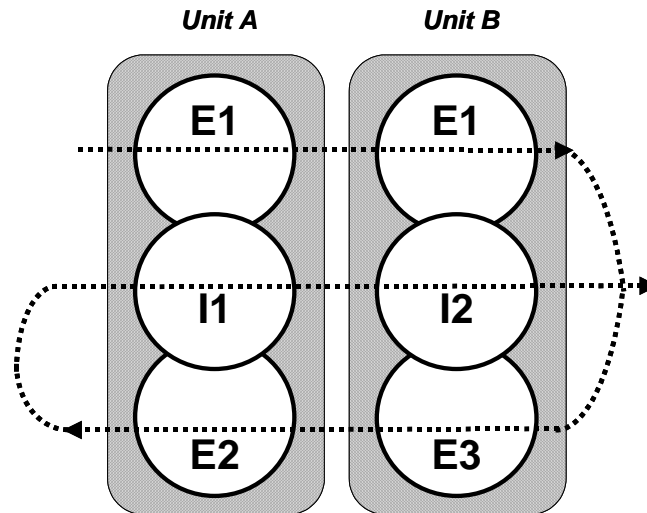


Fig. 3. Integration trajectory proceeding from easy to difficult, as determined by the specific situation at hand.

In a similar way, one can judge that, because of the specifics of the situation at hand, it would be best to proceed by starting at the core and continue with more “peripheral” integration activities, which could then be better assimilated because a solid, common cultural basis would already have been established. See Figure 4.

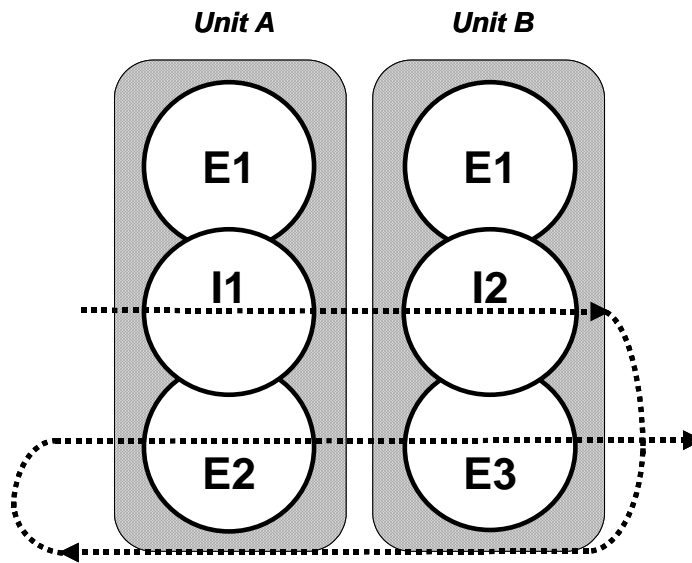


Fig. 4. A “core first” integration trajectory

Alternatively, it could be decided to start at the core and then proceed working on the integration in the context of just one of the units, because, say, the main concern was to “bring in” a sort of “cultural complement” to that unit, in which context any subsequent development could then be undertaken with the “guarantee” of a better understanding of the basic values, as shown in Figure 5.

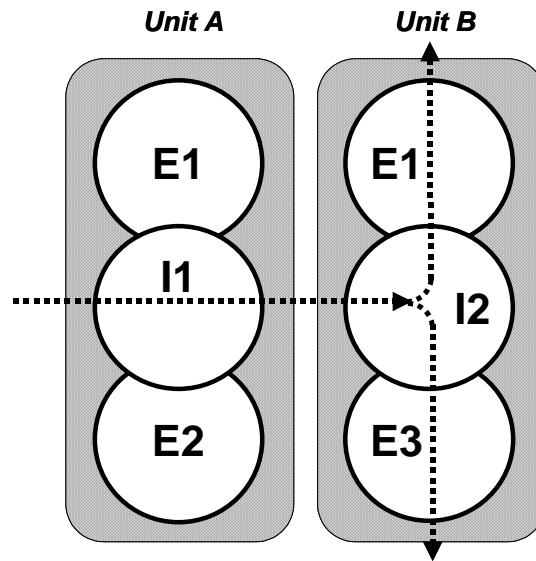


Fig. 5. A “culture importing” integration trajectory

And so on. It is not our intention here to give a “complete repertoire” of possible integration trajectories; this would be bound to be incomplete and would in any case miss the point. Our intended message goes in the direction of suggesting that thinking in terms of integration trajectories has at least two positive aspects. First, it makes you think in terms of the types of knowledge that need to be integrated, in the context of the “knowledge bases” relevant for the units to be integrated to function effectively. Second, it puts explicitly on the table the question of what kind of problems, stemming from the relationships that are bound (or that one needs) to develop among the involved individuals, groups or teams, will have to be addressed by the integration effort.

It is precisely in the context of the later where the concept of trajectory makes sense and points toward the “right” things to consider, in order to take into account the specifics of each organizational milieu and its implications regarding the corresponding learning efforts that will have to be undertaken to make the desired integration actually occur. We briefly discuss some aspects of this issue below. Depending on the characteristics of each organizational environment, the path represented by a given integration trajectory can be approached putting emphasis on different issues; for example one can imagine certain parts of a trajectory with an emphasis on exploration (i.e., developing genuine new knowledge pieces as a result of the integration process), or rather underlying exploitation (i.e., making sure that a simple conglomerate of know-how pieces work effectively just by coordinating their sequencing well enough), as described in March (1991).

5 Integration trajectories and organizational fit. The role of technology.

As suggested by the discussion in the preceding sections, the details of whatever integration process and trajectories that are implemented in one specific firm at one concrete point in time, need to be consistent with the organizational environment in which they are supposed to function. In fact, once put in place and action, they will become a constituent part of that environment.

Again, it is impossible to come about with a general purpose toolkit in order to be prepared to cope with any eventuality in this area –this would be tantamount to provide a toolkit for good management, which would do away with the need for managers, something that we think is impossible if we are to accept the traditional meaning of the word management. But it is nevertheless possible to reflect on some of the organizational issues raised by the integration trajectory concept.

The fundamental one has to do with the idea of organizational fit. A “core first” integration trajectory, for example, might be disastrous in a firm with a tradition of weak core values which are never stressed. It would imply a change of such a caliber that the organization would suffer a lot and the eventual result would most likely be nil if not counterproductive. But it could be precisely the right thing to do in a different organizational setting.

The issue is not very different from what is often said in the context of organizational change programs or initiatives. In fact, the underlying question is practically the same. Put in terms of integration trajectories the way we have suggested, however, it exhibits more explicitly some of its most important characteristics –those that have to do with learning. For example, if we consider that an “easy first” integration trajectory is adequate in a given organizational setting, this is probably due to the fact that in that setting we think that it would be too arduous to start the other way round; that is, that we judge the involved individuals or groups not prepared enough for such an effort – and thus, we should act consequently when designing and implementing whatever integration scheme we consider necessary. In a way, it boils down to saying that the desired change is going to be as “radical” (and consequently as difficult and bound to problems) as hard is the estimated necessary learning (Andreu, Ricart & Valor, 1997), and that it thus should be planned and implemented with this in mind. The fact that the proposed framework and the integration trajectory concept are based on explicitly confronting the kinds of knowledge involved, is only convenient to make that reflection in the context of what seems “natural”, which may come almost spontaneously.

In a similar vein, it comes also almost as naturally to think about how available technology can be brought to help in the design and implementation of integration

efforts at the corporate level. Again, reflecting on the kinds of knowledge involved, one can consider what kind of technology application is likely to result in positive results and what is probably going to be less effective or even counterproductive. Distinguishing between explicit and explicit knowledge is of course handy for this purpose. But it can be also revealing realizing that there is collective knowledge involved, or that maybe there are aspects of the culture to be shared that can be brought into play just making the use of a technology-based application that reflects those aspects (for example the use of a specific information system that fosters decentralization, and so on).

Thus, the concept of integration trajectories, based on how we draw a path through the knowledge bases of units in need of integration, seems to be a convenient way of thinking about such a process because it contributes to conceptualize it in a way that naturally brings into the picture aspects of learning, of how arduous the corresponding change process can be and consequently of how to design and implement them in order to ensure an appropriate organizational fit, and even of how one can bring technology in with the purpose of facilitating the process while not jeopardizing it in any fundamental way.

6 Conclusion. Some perspectives on further research.

We have addressed the issue of knowledge integration at the corporate level of a firm from the perspective of the types of knowledge that such a process involves. This has allowed us to show how it is possible to anticipate some of the characteristics that the involved relationships are bound to exhibit, and to propose the idea of integration trajectories that can be useful to design, plan and execute integration efforts in a way consistent both internally and with the organizational milieu in which they have to unfold, something fundamental to ensure their eventual success in terms of added value stemming from the corporate level in the firm.

Looking into the future to both refine the concept further in order to make it more useful and usable, and also to explore what it implies in more depth, there are several paths in which further research can proceed.

One almost obvious has to do with exploring real situations, through case studies, to improve our understanding of how integration trajectories seem to unfold in actual situations, and how the concept helps to understand them better, justify them, or plan and execute them in an effective way. After several cases have been studied, one can also think in terms of cataloguing the most commonly used integration trajectories components –this could led towards a sort of “best practices catalog” that might prove

to be useful not as much to apply directly, but rather as a source of inspiration in different integration settings. We are in the process of studying two such cases, with good perspectives, and plan to continue with additional ones in the future.

On the other hand, the construct needs to be strengthened theoretically. This can be pursued by grounding it more explicitly on well established concepts, developing hypotheses that can be tested empirically, and proceed then to evaluate the extent to which the implications hold. We might pursue this route after working on the case studies mentioned.

References

- Andreu, R., Ricart, J.E. and Valor, J. (1997): Process Innovation: Changing Boxes or Revolutionizing Organizations?, *Knowledge and Process Management*, 4, 2, 114-125.
- Andreu, R. and Sieber, S. (2000): Learning Trajectories: The Ultimate Requirement for Effective Knowledge Management, BPRC Conference on Knowledge Management: Concepts and Controversies, University of Warwick, UK.
- Becker, G. (1962): Investment in Human Capital: A Theoretical Analysis, *Journal of Political Economy*, Supplement 70, pp. 9-44.
- Blackler, F. (1995): Knowledge, Knowledge Work and Organizations: An Overview and Interpretation. *Organization Studies*, 16, 6, 1021-1046.
- Ciborra, C. and R. Andreu (2001): Sharing Knowledge across Boundaries, *Journal of Information Technology*, 16, 73-81.
- Connor, K. and C.K. Prahalad (1996): A Resource- based Theory of the Firm : Knowledge versus Opportunism, *Organization Science*, 7, 5, 477-501.
- Doeringer, P.B. and M. J. Piore (1971): *Internal Labor Markets and Manpower Analysis*. Lexington, MA: Lexington Books.
- Duncan, R. and A. Weiss (1979): Organizational Learning: Implications for Organizational Design, *Research in Organizational Behavior*, 1, 75-123.
- Edvinsson, L. and M.S. Malone (1997): *Intellectual Capital: Realizing Your Company's True Value by Finding its Hidden Brainpower*, New York: Harper Business.
- Grant, R.M. (1996): Prospering in Dynamically-Competitive Environments: Organizational Capability as Knowledge Integration, *Organization Science*, 7, 375-387.
- Hodgetts, R.M. (1999): A Conversation with Michael E. Porter: A 'Significant Extension' Toward Operational Improvement and Positioning', *Organizational Dynamics*, 28, 1.
- March, J.G. (1991): Exploration and Exploitation in Organizational Learning, *Organization Science*, 2, 1, 71-87.
- Nonaka, I. (1991). The Knowledge-Creating Company. *Harvard Business Review*, 69, 6, 96-104.

Nonaka, I., and H. Takeuchi (1995): *The knowledge-creating company*. New York, NY: Oxford University Press.

Polanyi, M. (1962): *Personal Knowledge*. New York: Anchor Day Books.

Sieber, S. (1998): *Learning, Knowledge and Interaction: Towards a New Approach to the Learning Intensive Organization*, Research Paper 361, Barcelona, Spain: IESE.

Selznick, P. (1957): *Leadership in Administration: A Sociological Perspective*,. Evanston: Row, Peterson and Company.

Spender, J.-C. (1994): *Organizational Knowledge, Collective Practice, and Penrose Rents*, *International Business Review*, 3, 4, 353-367.

Spender, J.-C., and Grant, R.M. (1996): *Knowledge and the Firm: Overview*. *Strategic Management Journal*, 17, 5-9.

Williamson, O. (1981): *The Economics of Organization: The Transaction Cost Approach*, *American Journal of Sociology*, 87, 548-577.