

**THE IMPACT OF KNOWLEDGE CODIFICATION,
EXPERIENCE TRAJECTORIES AND INTEGRATION
STRATEGIES ON THE PERFORMANCE OF
CORPORATE ACQUISITIONS**

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PERFORMANCE OF CORPORATE ACQUISITIONS**

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The Impact of Knowledge Codification, Experience Trajectories and Integration Strategies on the Performance of Corporate Acquisitions

This study addresses the following questions: (1) can organizations learn how to manage infrequent and heterogeneous tasks ? (2) If they can, then what are the mechanisms that might explain learning under these circumstances ?, and (3) what are the limitations under which these mechanisms operate ? A model based on explicit knowledge codification and tacit experience accumulation is submitted and tested using data from a sample of 183 acquisitions in the US banking industry. Measures of post-acquisition integration strategies and of pre-acquisition resource characteristics are included in the model. We find that tacit knowledge accumulation significantly impacts performance when the experiences are highly homogeneous, and that knowledge codification improves acquisition performance in the context of high post-acquisition integration, i.e. when the organizational challenge is particularly complex. Also, the level of integration between the two firms involved in the acquisition positively influences performance, while the replacement of top managers in the acquired firm impacts performance in a negative fashion. Implications are drawn for organizational learning theory and for a knowledge-based view of corporate acquisitions.

1. INTRODUCTION

The study of the mechanisms underlying the development of organizational competence has a long history and varied origins, ranging from production theory (Yelle, 1979; Deming, 1982; Dutton & Thomas, 1984; Epple, Argote & Devadas, 1991), to the study of technological innovation (Nelson & Winter, 1982; Dosi, 1982; Cohen & Levinthal, 1990; Clark & Fujimoto, 1991; Von Hippel & Tyre, 1995), from cognitive psychology (Cormier & Hagman, 1987; Healy & Bourne, 1995) to organizational sociology (March & Simon, 1958; Cyert & March, 1963; Levitt & March, 1988; March, 1991) to, lately, strategic management (Levinthal & March, 1993; Pennings, Barkema, Douma, 1994; Sanchez & Mahoney, 1996). The implicit assumption behind this massive amount of work is that the task to be mastered occurs in a sufficiently frequent and homogeneous fashion so that its outcomes improve quasi-automatically with the accumulation of experience. Unfortunately, as March, Sproull and Tamuz (1991) note, some of the most important events in the life of an organization do not happen with the frequency (and similarity) which the current theories implicitly assume. Understanding whether and how firms learn from rare and heterogeneous events represents, therefore, an ongoing challenge for both scholars and practitioners.

Corporate acquisitions certainly fall under the category of infrequent, heterogeneous and complex events, which present a significant learning challenge for any organization undertaking such type of ventures. Acquiring companies face a multiplicity of interdependent tasks throughout the acquisition process, from the necessary assessment of strategic (Rumelt, 1974; Singh & Montgomery, 1987; Porter, 1987) and organizational (Datta, 1991; Haspeslagh and Jemison, 1991) fit among the two firms, to the technical and psychological hazards of evaluation and negotiation processes (Haunschild, 1994; Dierickx & Koza, 1991), to the complexities of planning, coordinating and executing the post-acquisition integration process (Jemison and Sitkin, 1986; Shanley, 1994).

The objective of this study is to seek the combination of some basic insights from evolutionary economics and organizational learning theories in order to attempt an initial exploration of the mechanisms behind the creation of organizational capabilities in the context of infrequent, heterogeneous and complex administrative processes. More specifically, the investigation will cover the impact of both tacit and codified knowledge accumulation mechanisms on the development of a capability specialized in the management of post-acquisition integration processes. The US banking industry, where the study is positioned, is a good example of an extremely turbulent environment, where the tight coupling of deregulation, disintermediation, and technological evolution processes have generated an unprecedented wave of mergers, acquisitions, and internal reorganizations. It thus provides a good arena for testing whether and how an expert acquirer can extract and defend the rents from its own administrative wisdom.

The following section 2 summarizes several strands of prior research relevant to the empirical context under study, while the theoretical approach is introduced in section 3, where testable hypotheses are also advanced. Section 4, then, describes the research design, some of the key findings in our field work and the operationalization of the most important theoretical constructs. The results of the analyses performed on the data gathered are then provided in section 5, while section 6 concludes the paper with the discussion of some implications for the corporate strategy and organizational learning theories.

2. PERFORMANCE OF CORPORATE ACQUISITIONS

In our review of prior research, we will summarize the theoretical arguments made and the empirical results obtained in the quest for the explanation of performance in acquisition processes.. We will then examine research on the process of managing acquisitions and then focus on the rare, recent attempts to estimate a link between acquisition expertise and performance.

2.1 The Market for Corporate Control and the Resource-based Views of M&A

Research in financial economics examined returns to acquirers and targets in large samples of acquisitions. The dominant view in the financial economics literature is that acquisitions are transactions reflecting the workings of the market for corporate control. Management teams vie for the control of productive assets of firms. If a particular management team underperforms, then a more competent team takes its place (Jensen and Ruback, 1983). Empirically, the research finds that while there are positive gains from the combination of the acquiring firm and the target's assets, much of the gains accrue to shareholders of the target firm. More recent empirical work shows evidence that *average* abnormal returns to the acquiring firm are either statistically equivalent to (Franks et al., 1991; Loderer & Martin, 1992) or lower than (Agrawal et al., 1992) zero.

Research in financial economics has historically revolved around the question of the location of the mean of the distribution of abnormal returns. Very rarely were explanations for the variance of that distribution advanced, typically based on characteristics of the negotiation process (hostile vs. friendly attitude, number of bidders, type of auction etc.). The strategic management field, on the other hand, has the merit of having advanced a major body of theoretical and empirical literature focused on factors which might provide a systematic discrimination between high and low performance in acquisitive events. The most widely used perspective on acquisitions is the resource based view of the firm (Wernerfelt, 1984; Rumelt, 1984; Barney, 1988). Empirical work in this area has used the resource perspective of the firm in order to test the impact of resource relatedness on the performance of these transactions (Chatterjee, 1986; Singh and Montgomery, 1987; Lubatkin, 1987; Shelton, 1988; Seth, 1990, Healy, Palepu & Ruback, 1992, Chatterjee et al., 1992). The evidence suggests of a complex relationship between the two constructs, because, for acquirers to earn positive abnormal returns on their investments, they must create a uniquely valuable combination of their assets with those of the

acquired firm. This condition does not materialize in a systematic way, and therefore acquirers cannot expect to have positive abnormal returns based on the degree of relatedness of their assets with those of the target firm. The premiums paid to gain control of the target typically reflect the potential synergies that could be gained from relatedness (Barney, 1988).

There have been recent extensions to the earlier studies. Anand and Singh, (1997), for example, compared consolidation-oriented acquisitions with diversification-oriented acquisitions in the U.S. defense industry. They found that consolidation-oriented acquisitions do result in positive abnormal returns, as well as in significantly higher post-acquisition cash-flows, as compared to diversification-oriented acquisitions. These results are consistent with the arguments made by Porter (1987) when he argued that acquisitions should be conducted in areas where the firm enjoys competitive advantage, and there are benefits from sharing critical resources between the acquiring and acquired firms.

2.2 Research on the Process of Acquisition Management

The process of managing acquisitions is substantially more complex to study empirically, because of the lack of process level data typically available in sufficiently large number of observations. As a result, research on the process of managing acquisitions is still in the exploratory stage, relatively to the literature summarized above, and empirical regularities are still being established.

One of the earlier pieces of research on the management of acquisitions, by Jemison and Sitkin (1986), indicates that it is useful to think about acquisitions in terms of both their strategic fit and organizational fit. Organizational fit tends not to correspond neatly to strategic fit. Thus, the complexity of an acquisition from an organizational standpoint can be quite different from what may be implied by the strategic considerations driving the transaction.

Haspeslagh and Jemison (1991) suggest that acquisitions should be classified based on the strategic role they would play in the acquired firm. They propose two dimensions along which the

ongoing management of acquisitions can be classified: the need for strategic interdependence and the need for autonomy. Based on these two dimensions, they propose integration approaches to manage acquisitions, and suggest that acquisition performance depends upon the congruence between the pre-acquisition conditions determined by the combination of the two dimensions and the integration approach adopted.

One important dimension in post-acquisition management is the choice of the level of integration of the acquired firm. As the acquired firm is integrated more extensively in the acquiring firm, a number of both positive and negative outcomes might be expected. First and foremost, the complexity of the post-acquisition process increases substantially (Kitching, 1967, Jemison & Sitkin, 1986, Pablo, 1994), as acquirers face higher levels of uncertainty and take higher degrees of risk (Pablo, Sitkin and Jemison, 1996). For example, the integration process typically lasts longer than acquirers expect (Shanley, 1987; Mirvis and Marks, 1992) and can be highly disruptive to the established routines and the employees' morale of the acquired firm (Marks & Mirvis, 1985; Schweiger, Ivancevich and Power, 1987; Buono & Bowditch 1990, Astrachan, 1990; Schweiger & DeNisi, 1991). However, higher levels of integration among the two firms are necessary in order to realize the value creation potential of the transaction, either through cost efficiency or through revenue enhancement mechanisms (Singh & Montgomery, 1997; Anand & Singh, 1997; Capron, Doussage & Mitchell, 1998). Managing the tension between the positive and the negative implications of the integration process, i.e. maximizing cost efficiencies or revenue enhancement while minimizing organizational disruptions requires the development of ad'hoc competencies. Higher levels of integration are, in fact, associated with higher levels of acquisition experience and with the development of support tools specific to the management of the integration process (Zollo, 1998a and 1998b).

Another important dimension of the post-acquisition integration process consists in the degree to which pre-existing resources within the two firms are replaced or dismissed after the completion of the transaction. Chief among the various types of firm resources is obviously the human and social capital embedded in the employees and, particularly, in the top management team. The degree to which post-acquisition turnover of human resources is actively pursued by acquirers eager to speedily implement the desired changes and obtain the expected performance improvements, has been researched in a small number of empirical studies. Contrary to the predictions of the “market for corporate control” approach, Cannella and Hambrick (1993) find that managerial turnover was harmful to acquisition performance, and that the impact increased in magnitude the higher the degree of seniority of the replaced managers. More recently, Krishnan, Miller and Judge (1997) reach similar conclusions, adding that the degree of complementarity among the two top management teams positively influences performance and should therefore be protected, when possible.

The antecedents to this decision have also been subject to a limited number of empirical studies. Walsh (1988) empirically examines top management turnover rates, comparing post-acquisition turnover in a select group of companies and a control group of firms selected from their respective industries. He finds that turnover rates cannot be explained by the product market relationship between the acquirer and the target firm. In more recent work, Walsh (1989) and Walsh and Ellwood (1991) find that post-acquisition turnover can be explained by characteristics of the negotiation process and by the pre-acquisition profitability of the acquirer. This emphasis on the acquiring firm’s features as opposed to the acquisition itself foreshadows Zollo (1998a)’s study, which also focuses on the acquirer’s knowledge attributes. Controlling for attributes of the acquisition (relatedness, resource quality, relative size, time) and of the acquiring firm (pre-acquisition performance and size), he finds that the most powerful predictor of the probability to replace the entire top management team is the same

type of decision made a random number of acquisitions prior to the current one, i.e. that this decision is typically highly routinized. The degree of codification of the integration process is another significant, but less crucial, explanation of the replacement decision.

2.3 Organizational Learning and Acquisition Performance

The extent to which the acquiring firm accumulates expertise in managing the various phases of the acquisition process is an intuitively important antecedent of acquisition performance. Decades of research on the learning curve phenomenon observed in a wide range of production processes (Yelle, 1979; Deming, 1982; Dutton & Thomas, 1984; Epple, Argote & Devadas, 1991), together with theoretical insights drawn from the behavioral theory of the firm (March & Simon, 1958, Cyert & March, 1963; Levitt & March, 1988; Cohen & Levinthal, 1990; March, 1991; Levinthal & March, 1993) and extensions to the organizational level of analysis of cognitive psychology (Cormier & Hagman, 1987; Healy & Bourne, 1995) point towards the expectation of a positive impact of experiential learning on the performance of corporate acquisitions. However, empirical evidence on the subject is limited and, for the most part, of unambiguous nature. While some studies find a positive influence (Fowler & Schmidt, 1989, Pennings et al., 1994), others find non-significant results (Lubatkin, 1987) or a U-shaped relationship (Haleblian & Finkelstein, 1998b). A number of arguments could be made in order to explain this state of affairs:

- inconsistencies in the measurement of the performance variable, which ranges from accounting data (Fowler & Schmidt, 1989) to stock price reactions (Lubatkin, 1987, Haleblian & Finkelstein) to the duration of the acquisitive expansion (Pennings et al. 1994).
- lack of consideration for the characteristics of the acquisition experiences. Organizational learning has been proxied in all these studies with the raw count of previous acquisitions completed by the same acquiring firm. However, different experience trajectories (Baum & Ginsberg, 1994) might produce

different learning outcomes (Kogut & Chang, 1994; Chang, 1995). The degree of homogeneity among the experiences, for example, might play an important role in facilitating positive spillovers from past experiences to the current ones (Cormier & Hagman, 1987).

- lack of consideration for learning mechanisms other than learning-by-doing. As will be argued below, organizational capabilities might arise not just from tacit accumulation of knowledge from previous experiences, but also from the explicit articulation and codification of lessons learned from them. Part of the problem, then, might be that acquisition performance is sensitive to a mix of learning mechanisms, some of which have not been captured in previous studies.
- finally, the learning effect might not be there at all ! There are several reasons why acquisitions might not be subject to learning curve effects; in other words, firms might not be able to develop those specific kind of capabilities which would enable them to improve the performance of their acquisitions. These barriers to learning range from the low frequency and the high heterogeneity of the task to be learned (the acquisition process, particularly in its integration phase), to the high numerosity and interdependence of simultaneous sub-tasks (think about the decision-making and the action steps necessary to complete an integration process) and the consequently high degree of causal ambiguity (Lippman & Rumelt, 1982) between the decisions/implementation actions taken during previous acquisition experiences and the array of performance indicators.

In the following section, we will build on some recent development in organizational learning and evolutionary economic theory in order to submit a set of arguments which might explain the effectiveness (as well as the lack thereof) of different organizational learning mechanisms under the extreme conditions imposed by the type of task studied: infrequent, heterogeneous, complex and causally ambiguous processes.

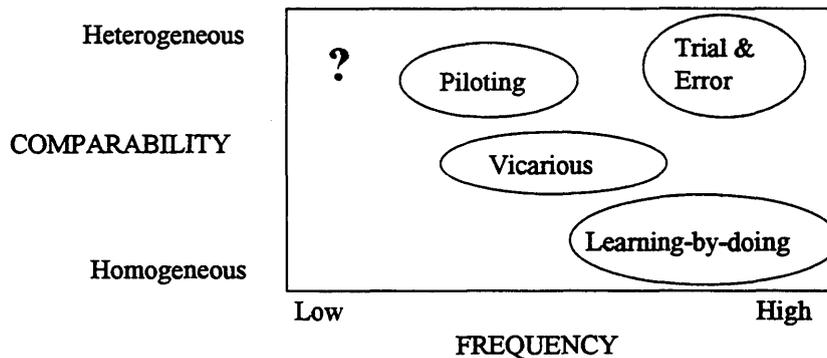
3. THEORY AND RESEARCH HYPOTHESES

This section presents the theoretical perspective invoked and then proceeds by submitting the research hypotheses based on this, as well as the received, theory.

3.1 Task Characteristics and Organizational Learning

Consider how some of the most important organizational learning mechanisms might map onto two of the dimensions of interest for the purpose of extending our comprehension of learning behavior in “extreme” contexts: task frequency and comparability¹.

Organizational Learning Mechanisms



Vicarious Learning. Different forms of vicarious learning are possible in various combinations of task frequency and comparability. A firm can decide at any moment to solicit the help and the advice of some specialized consulting agency, or to attempt to imitate some type of best practice developed by a successful competitor. Until this action translates into first-hand experience that leads to the accumulation of internally generated (and embedded) knowledge, however, it will be difficult to assume

¹ Frequency is conventionally defined as number of events within a unit of time (e.g. one year in contexts such as acquisitions). Comparability is defined as the degree of similarity with which the task presents itself each time; in exploratory tasks comparability is, by definition, low.

that the organization has been able to develop any capability or internalize any best practice. Hearing about Toyota's successes with its lean production system will not produce any effect on Ford's stock of productive knowledge unless and until Ford will initiate material changes in its own systems and put its experiential learning mechanisms at work. We will assume in this paper that an organizational capability can be developed only through learning processes based on the accumulation of direct experience.

Trial and Error. Trial and error mechanisms are typically in use with exploratory learning contexts where highly frequent events can be experienced at relatively low cost for the single event (e.g. search for new chemical compounds). These learning mechanisms can hardly be considered viable tools, however, when the costs attached to the "errors" are particularly high (unsuccessful acquisitions, joint ventures or reorganization processes etc.), and the availability of the "trials" is also scarce. While the possibility to create and develop an organizational capability through exploratory learning mechanisms cannot be excluded a priori, risk and frequency considerations might lead to expect only a secondary role played by trial & error learning processes within the context under consideration.

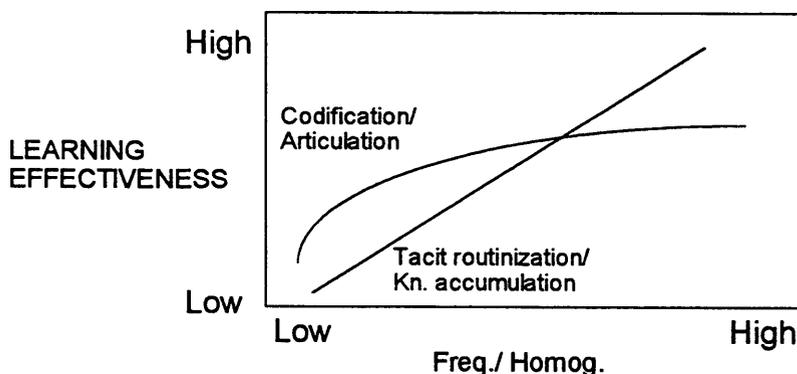
Learning by doing. Learning by doing is probably the most frequently studied mechanism in both theoretical and empirical work. However, it is also the one mechanism that relies most on the two assumptions of high frequency and comparability of the experienced events. As observed above, we currently do not know how this mechanism performs once these two assumptions are relaxed.

Piloting. When an infrequent task presents itself in diverse ways every time, and requires significant investments to be experienced, a more efficient way to accumulate knowledge might be provided by the execution of a pilot project or the in-depth analysis of a prototypical event. This is akin to the notions of "quasi-histories" and of scenario analysis, which March, Sproull and Tamuz (1991) describe as possible solutions to the apparent paradox of "learning from samples of one or fewer". These particular arrangements seem to be able to combine the tacit knowledge accumulation component necessary with

even such a rare (i.e. unique) experience, with some type of cognitive activity aimed at the analysis and extraction of all the possible experiential value from the few events at one's disposal.

This last mechanism is the most likely candidate, in our opinion, for explaining the mechanics of organizational learning in the context under consideration. In order to build their competencies under these "extreme" conditions, firms might have to use more of the cognitive rationalization mechanism present, for example, in brainstorming or knowledge codification activities, and rely less on tacit, semi-automatic" accumulation of knowledge in the minds of actors exposed to repeated tasks. This dichotomy of knowledge accumulation mechanisms follow the tradition of distinguishing between tacit and explicit knowledge, based on Polanyi's work (1962: 1966) and is akin to the autonomous vs. induced learning mechanisms advanced by Dutton & Thomas (1984) as possible explanations for the learning curve phenomenon. The difference in their effectiveness for explaining the evolution of organizational competence is a matter of degree, as they both co-exist within the firm at any point in time. The following figure attempts to capture the intuition:

Task Features and Learning Mechanisms



At high frequency levels, we witness the world that Nelson and Winter (1982) described. In it, capabilities are created mainly through tacit knowledge accumulation mechanisms and codified knowledge is either non-influential, because operators just do not use the manuals and other codified supports and prefer to rely on their own experience, or it is counterproductive, as it might inhibit attempts to adapt the procedures to new requirements that have emerged by virtue of simple practice and performance feedback loops.

At low frequency levels, however, the relationship between the two mechanisms could be inverted with respect to their relative ability to facilitate learning and create organizational capabilities. The rationale behind the advantage of codification processes over tacit knowledge accumulation can be argued on the basis of the following observations. First, tacit knowledge accumulation cannot account for the problem of transferring past experience to domains characterized by superficially similar, but essentially different conditions; only a deliberate cognitive effort that attempts to extract the generalizable causal relationships between conditions and performance can avoid this frequent mistake (Cohen & Bacdayan, 1994). Some very recent contributions applied to the context of corporate acquisitions (Haleblian & Finkelstein, 1998a; 1998b) show that these negative transfer effects, where the second acquisition experience has a systematically worse performance than the first one if it is inherently different (e.g. a different degree of resource relatedness), can be of significant magnitude.

Second, many authors (Henderson & Clark, 1990; Christensen, 1993; Iansiti, 1995) have reached the conclusion that relying on tacit knowledge accumulation can be very risky when environmental turbulence exists. When low frequency and high task heterogeneity create high barriers to knowledge accumulation, the context can be likened to a highly turbulent environment where the usefulness of past experiences is significantly reduced. Again, an explicit effort directed towards the in-depth analysis of the few available experiences, and the consequent appreciation of some of the action-

performance relationships, might result in an improved way to handle the complexities of these infrequent and diverse tasks.

Third, the attention-based view of the firm (Ocasio, 1997) tries to explain both strategic choice and competitive advantage based on the allocation of managerial attention among a large magnitude of potential priorities. Knowledge codification can be a strategic variable, as it depends partially on the willingness of the firm to invest time and effort (i.e. attention) to extract the most valuable lessons from its previous experiences, and can therefore lead to higher process and organizational performance. The focus of the attention in the present analysis will be then on the complex interplay of these two knowledge mechanisms (explicit rationalization and tacit accumulation) in their combined impact of the creation and evolution of competence.

3.2 Knowledge Codification, Experience Trajectories and Organizational Capabilities

Organizational capabilities have been studied following several different approaches. Some scholars view them as stemming from the recombination (Kogut and Zander, 1992; Grant, 1996) or modular construction (Henderson & Clark, 1990, Clark & Fujimoto, 1991; Sanchez & Mahoney, 1996) of existing knowledge. Others have introduced additional elements inspired to search behaviors (March & Simon, 1958), such as the process by which firms fine-tune existing routines using knowledge accumulated from past experiences and feedback mechanisms (Winter, 1987; Cohen & Bacdayan, 1994; Winter, 1995, Cohen et al. 1996), or the more radical reconfigurations of resources and routines (Tushman & Romanelli, 1985; Romanelli & Tushman, 1994; Teece, Pisano & Schuen, 1997).

In an effort to develop a parsimonious representation of the merits of the different positions offered, one could single out two elements that seem essential for conceiving of the formation of organizational capabilities. Firms have to: (1) accumulate knowledge from direct experiences related to

the task in question, and (2) make sense of the accumulated knowledge through articulation and, to an extreme, codification processes. The following definition can therefore be submitted:

Definition. *An organizational capability is the outcome of a process of tacit accumulation and explicit articulation and codification of knowledge derived from past experiences.*

Any reference to performance, either at the firm or at the task level, has been purposely avoided in this definition in order to avoid the well-known tautology of defining a capability as an improvement in performance. The definition is centered on knowledge-based phenomena, which hypothetically correlate with improved quality in process and organizational outcomes, but this association is neither necessary to the definition, nor required for theorizing on how firms build their stock of competencies. Several arguments about the possibility of negative performance consequences arising from capability building have been made. They range from superstitious learning (Levitt & March, 1988) to myopic (Levinthal & March, 1993) to negative transfer effects of lessons learned in one context to a different one (Cormier & Hagman, 1987; Cohen & Bacdayan, 1994; Haleblan & Finkelstein, 1998).

The notion of knowledge "*accumulation*" is derived from the learning curve literature summarized above, which ties the stock of production experience to the evolution of production costs. For our purposes, however, knowledge accumulation refers specifically to the tacit absorption of wisdom provided by the simple exposure to several relatively similar events (Polanyi, 1962, 1966). In the context under study, we will follow Baum and Ginsberg (1994) notion of experience trajectory to indicate the stock and the type of acquisitions completed by the same acquirer.

The other key notion of explicit articulation and codification of experiential knowledge incorporates and builds on the Weickian tradition of sense-making (Weick, 1979) as a necessary (albeit not sufficient) prerequisite for the creation of competence. It is also related to the notion of a capability as a recombination of existing knowledge (Henderson & Clark, 1990, Kogut & Zander, 1992, Grant,

1996, Sanchez & Mahoney, 1996). Here, however, we intend to limit the sphere of this construct to the cognitive part, where only the explicit efforts to understand the causal mechanisms behind the correct or improved execution of a certain task are considered (Sanchez & Heene, 1997). Examples include a group of individuals tackling an unresolved issue, brainstorming on the complex performance outcome of a recently completed task, or drafting a new procedure to simplify the future executions of a certain task.

The primary goal of the proposed definition, then, is to disentangle the “semi-automatic” knowledge accumulation mechanism from the cognitive effort to reflect upon and analyze the accumulated experience in order to generate higher levels of understanding of a certain task or phenomenon. In this sense, organizational capabilities differ from the concept of routines because they contain the cognitive element, and from the standard notions of problem-solving or strategy-making activities, because capabilities can also be developed without an explicit cognitive effort.

It is important to note that there is a fundamental difference between Arrow’s (1962b and 1974) notion of information as a costlessly transferable and usable public good, and the type of organizational knowledge examined here, which emphasizes the understanding of how highly complex and heterogeneous organizational processes should be carried forward in a timely, cost-effective, and precise way. Knowledge of this kind is difficult to observe and assess even for its holder (Polanyi, 1962; Rogers, 1980), is “sticky” (Szulanski, 1993 and 1997), is highly system-dependent (Winter, 1987), and only partially codifiable (Kogut & Zander, 1992 and 1993; Nonaka, 1994; Zander & Kogut, 1995). Consequent to all these assumptions is the observation that, far from being a free good with no potential for value creation, organizational knowledge might be at the cornerstone of firms’ ability to create and sustain competitive advantage.

The tools underlying the knowledge codification construct can take the form of manuals, blueprints, computer models, guidelines, and other means which might describe what to do in a certain situation (“know-what”). If sufficiently evolved, these tools might also provide a description of how to do it (“know-how”) and eventually of why it makes sense to do it that way (“know why”, Seely Brown & Duguid, 1991). These codified tools are generally available to multiple individuals and therefore facilitate the diffusion (and, in part, the imitation) of accumulated knowledge (Kogut & Zander 1992; Nonaka, 1994; Zander & Kogut, 1995). For our purposes, the salient characteristics of codified knowledge are not so much in the use and the diffusion of its outputs. Its importance lies in the process through which these outputs are created, that is the time and effort invested in analyzing the firm’s past experiences, in abstracting to some stable causal relationships, and in incorporating this new wisdom in newly created or updated tools. Thus, codification serves not only as a reference for learning, reviewing, and spot-checking the execution of a certain task. It can also facilitate the creation of organizational capabilities, as the codification process itself forces the level of awareness of the cause-effect relationships to rise, thereby facilitating the emergence of solutions, and the improvement of collective competence.

Experience trajectories and knowledge codification are clearly not orthogonal constructs, and some degree of correlation can be expected between the two. It is very hard to conceive of an organization in which only one of the two mechanisms is active. However, the two mechanisms are separable in their distinctive loci of accumulation of knowledge (human brain in one case, paper or electronic files in the other). Studying them as such seems to be correct from a theoretical point of view, and might be particularly useful for the normative aspects of the theory on the creation and evolution of *organizational capabilities*.

3.3 Research Hypotheses

Performance Implications of Knowledge Mechanisms

In taking a knowledge based view of acquisitions, we suggest that the performance of the acquisition process is influenced by the degree to which the acquiring firm accumulates and codifies prior acquisition experience. Acquisitions certainly qualify as relatively infrequent, heterogeneous, complex² and causally ambiguous events, which translate in organizational tasks which might be subject to the observations made above regarding the relative effectiveness of the learning mechanisms under study. In the context of knowledge about the management of acquisitions, then, the greater the extent to which acquiring firms codify their past experiences, the greater is the likelihood that the firm will have effective post-acquisition management routines, i.e. that they can develop post-acquisition integration capabilities. At the same time, however, the creation of effective post-acquisition management routines might be co-determined by the tacit accumulation of past experiences, i.e. by larger stocks of experienced events.

One last point is specific to the effectiveness of the tacit knowledge accumulation mechanism in influencing the degree of organizational learning and the consequent development of organizational capabilities: it has to do with the degree of homogeneity among past experiences, on the basis of which organizations are supposed to be able to build their practices. Given a certain level of codification of a process, it seems plausible that the higher the degree of homogeneity in the characteristics of the events experienced, the higher the likelihood that knowledge accumulates in a tacit, semi-automatic, fashion. Intuitively, it will be easier to learn tasks which present themselves in similar forms, such as acquisitions of firms in the same geographical areas, or in distressed conditions.

² In the sense specified above: numerous, simultaneous and interdependent sub-tasks

From the above discussion on the mechanisms through which acquiring firms might be able to develop a specific capability in the management of the integration process, and therefore to systematically improve the economic performance of its acquisitions, we can submit the following hypotheses:

H1: The higher the degree of codification of the knowledge about the post-acquisition integration process, the higher the economic performance of the acquisition

H2: The greater the acquiring firm's acquisition experience, the higher the economic performance of the acquisition.

Besides generalized acquisition experience (i.e. the total count of prior transactions), the arguments made above about the positive role of the degree of homogeneity among the past experiences translates in the following hypothesis:

H3: The greater the firm's experience with homogeneous types of acquisitions, the higher the economic performance of the acquisition.

Performance Implications of Post-Acquisition Decisions

The literature reviewed in section 2 enables us to submit some additional hypotheses on the expected influence of two types of post-acquisition decisions: the level of integration and the degree of replacement of the top management team of the acquired firm.

Higher levels of post-acquisition integration allow firms to extract the advantages derived from potential economies of scale and scope, and therefore should be associated with higher performance of the acquisition process (Datta and Grant, 1990). However, higher levels of integration between firms also result in higher levels of disruption of the pre-existing resources and routines in both firms, and therefore to potential hazards for the performance of the combined entity (Amburgey, Kelly and Barnett, 1993; Haveman, 1992 and 1993). Also, the complexity of the integration process is clearly a direct function of the level of integration, as high integration approaches require a larger number of highly

interdependent decision-making processes, in which more parts and functions of the two organizations become involved. Finally, high integration levels translate into increasing, explicit and hidden costs relative to the expenses (training, lay-offs, information systems conversion etc.) and to the time and managerial attention (Ocasio, 1997) dedicated to the design and implementation of the integration process.

In order to seek help in the solution to these obvious conflicts in the theoretical arguments around the relationship between integration and performance, we turn to the study of the characteristics of the industrial context of our interest. The U.S. commercial banking industry is undergoing very dramatic consolidation as a result of regulation, technology changes and changes in consumer demand for banking services. It has been argued that there are significant potential economic benefits from merging banks in particular geographic areas. These benefits would stem from efficiencies gained by combining organizations and eliminating overlapping activities, such as retail branches in proximate locations, IT support, human resource management and other staff functions. Arguments driving the benefits of consolidating assets in the industry point to efficiencies gained by extensive integration between organizations in the post-acquisition phase. Given the context of our study, we would expect that the benefits from economies of scale and scope would emerge when the firms integrate their operations extensively, and that these benefits might overcome the negative impacts due to organizational disruptions, process complexity and implementation costs. In consideration of the evolution of the industrial context, and of the arguments offered in the most directly related precedent study (Datta and Grant, 1990), we propose:

H4: The higher the degree of integration of the acquired firm within the acquirer, the higher the economic performance of the acquisition.

A similar theoretical conundrum exists when we consider the relationship between resource replacement and acquisition performance. Of particular interest, given the attention received both in the theoretical and empirical literature, is the replacement of the top management team of the target firm. However, this variable can be considered only as a good proxy for a more general construct of firm-wide replacement of resources, such as brand names, product lines, physical assets, etc.

According to the arguments made by proponents of the “market for corporate control”, the better team gains control of the productive assets of the acquired firm (Manne, 1965; Jensen and Ruback, 1983) and therefore the performance of the combined entity should improve. As reviewed in section 2, however, scholars working in the human resources management and organizational behavior traditions suggest that the replacement of top management in the acquired firm will result in reduced economic performance because of disruptions created by the departure of such executives. Fortunately, in this case the little empirical evidence available is unambiguous; both the study by Cannella and Hambrick (1993) and by Krishnan, Miller and Judge (1997) find that managerial turnover reduces acquisition performance. Therefore, we propose the following hypothesis:

H5: The greater the level of replacement of top management in the acquired firm, the lower the economic performance of the acquisition.

The combination of the arguments submitted above in regards to the implications of the knowledge codification mechanism for the performance of acquisitions, and the arguments regarding the increasing complexity of high integration approaches, suggest the possibility of a significant interaction effect among these two precursors of acquisition performance. According to this hypothesis, higher degrees of codification of the integration process are increasingly beneficial at increasing levels of integration, as the codified tools should allow a considerable reduction of the cognitive complexity of the integration process (simplifying the decision-making process and facilitating the coordination of the

numerous implementation sub-tasks, see also Gavetti & Levinthal, 1998). At lower levels of integration, though, the codification of the integration process might represent an unnecessary bureaucratization of the integration process, which might hinder, as opposed to help, the chances of success of the overall acquisition. These arguments lead to the following hypothesis:

H6: The higher the level of codification in the context of a higher level of integration, the higher the economic performance of the acquisition. However, the higher the level of codification in the context of a lower level of integration, the lower the economic performance of the acquisition.

4. RESEARCH METHODOLOGY AND MEASURES

4.1 The Research Setting

The hypotheses set forth above have been tested with a large study of acquisitive activities in the U.S. commercial banking industry. This setting was particularly well suited for this study. First, we needed to have a fairly comparable set of acquiring firms to study. By holding the industry constant, we ensured that the firms involved in the study were comparable in the environmental conditions that they were facing. Second, the industry was undergoing a rapid period of consolidation in response to changes in regulation, allowing banks to cross state lines as they strove to become regional and national players. This created a sufficiently large universe of potential observations, in a relatively compact time frame, almost ideal conditions for survey-based inquiries. Third, given the relevance of acquisition-driven growth in the industry, we found a particularly fertile ground for both field work and survey participation. Fourth, banking has been the single most active industry in terms of acquisition volumes since the beginning of the 90s, with a share of the total domestic volumes estimated to be close to 30%. This provides some degrees of comfort in generalizing some of the results to other industries, at least in the service sector.

This research had two phases: initial, field based research, and then a larger sample, questionnaire based study of post-acquisition management and performance. For the initial field

research, we obtained access to twelve banks, all of whom are active acquirers. We interviewed 45 decision-makers in these banks to obtain a finer understanding of the process by which they learned from prior acquisitions. We made the following observations:

- (1) Most acquisitions made prior to 1990 were managed as virtually autonomous affiliates, without significant changes in their information systems, and top management teams were typically not replaced.
- (2) More recently, acquiring banks sought ways of obtaining efficiencies by integrating the operations of the acquired bank into their own, by standardizing products of the combined organizations, and by converting information systems.
- (3) Acquirers varied in their approaches to managing acquisitions not only longitudinally (higher levels of integration over time) but also cross-sectionally. Some acquirers allowed the acquired units to remain relatively autonomous, and typically retain their top management. Banc One is an example of this approach to managing acquisitions. On the other hand, equally experienced acquirers use substantially different approaches to manage essentially the same types of task, by integrating and \ or replacing existing resources to much higher degrees. Nationsbank is considered to provide a good example of this more aggressive integration strategy.
- (4) Finally, we were surprised to witness the degree to which some acquirers had codified the integration process, and the large cross-sectional variation among different acquirers along this dimension. Experience levels seemed to explain part, but not the entirety of this variation, as there were several inexperienced acquirers with highly sophisticated integration tools and highly experience ones with only average levels of codification.

The large sample study was implemented on the 250 largest bank holding companies in the U.S., which cover more than 95% of the industry assets. The asset size of the smallest invited institution was about \$400 million, which implies very rare acquisition activity and very small transaction sizes (usually one or two branches). Further extensions of the sample to smaller institutions were likely to have resulted in very few responses, because of the scarcity of acquisitive events, and in significant loss of comparability between the transactions analyzed.

The questionnaire consisted of two parts:

- (1) The Acquisition History Profile: this was a list of all acquisitions conducted by the bank, with basic information about each of them, such as their asset size, the degree of market overlap, pre-acquisition profitability, level of integration and the replacement of the top management team.
- (2) The Acquiring Bank Questionnaire, which describes characteristics of the acquisition process, including the type and the time of creation of acquisition support tools such as integration manuals, system conversion manuals, product mapping models, training packages etc.

Of the 250 bank holding companies contacted, 70 did not have any experience of acquisition after 1985, and 16 were acquired. Of the remaining 164 banks, we obtained responses from 51, translating into a response rate of 31.7%. This response rate is strong given the complexity of the survey and the involvement of top management in responding to the survey.

Among the respondents, we count ten of the twelve most active acquirers in the industry. The 51 acquirers had 577 acquisitions among them, amounting to an average of over ten acquisitions each. The responding organizations are not significantly different from the original set of 250 organizations in terms of return on assets, return on equity or efficiency ratios, although they tend to be larger in terms of asset size ($p < .05$).

The respondents to the survey are very familiar with the acquisition process, being either the manager for corporate development, the coordinator of post-acquisition integration processes or the key senior manager accountable for acquisition decision making and performance.

4.2 Measures

Dependent Variable: Performance. Acquisition performance is measured as the difference between Return on Assets (ROA) of the acquiring bank three years after the acquisition versus the same measure one year before the acquisition. The acquired banks in our study are typically consolidated, from an accounting standpoint, into the acquiring banks, leaving no chance for an analysis of the target's accounting performance variation. In order to control for market conditions, the acquiring bank's return on assets is first adjusted against the performance of its peers in the same geographic area³. Then, a difference is calculated over time, subtracting competition-adjusted performance one year before the acquisition from that measured three years after the acquisition. The change in performance over time is expressed as:

Change in ROA = $(ROA_{i,t+3} - ROA_{c,t+3}) - (ROA_{i,t-1} - ROA_{c,t-1})$ where

$ROA_{i,t+3}$ and $ROA_{i,t-1}$ = Return on assets of acquiring bank i in years t+ 3 and t-1 respectively, and

$ROA_{c,t+3}$ and $ROA_{c,t-1}$ = Average Return on Assets in the same geographic area of the acquiring bank i at years t+ 3 and t-1 respectively

Integration was measured with a single scale that had four levels, with one representing complete autonomy, and four representing complete integration of the acquired firm.

³ Seven geographic areas in United States (New England, North Atlantic, South Atlantic, Mid-west, South, Rocky Mountains, and Pacific) and one for Canada were used to benchmark performance.

Replacement was also measured on a four-point scale, with one representing the retention of the entire top management team and four representing its complete substitution.

Relatedness was measured in terms of a classification of whether the acquisition was conducted in-market (coded as “1”) or out-market (“0”). An in-market acquisition consisted of the acquisition of a bank that competed in the same geographic market and product lines targeted at the same customer groups. An out-market acquisition was a transaction in which the acquisition was made of a bank in the different geographic market than the acquiring bank. This is a good proxy for resource relatedness in the industry, given the importance of geographic location as key competitive factor and the role played by the rationalization of the branch network in the process of creating value from acquisitions through cost efficiencies. From a strategic management standpoint, in-market acquisitions can be considered as horizontal transactions, while out-market ones can be considered market extensions.

Resource Quality. The pre-acquisition quality of the resource endowment of the acquired firm was measured by assessing the performance level of the target bank prior to the acquisition. The scale anchors were: “-2” (the acquired institution was in a bankrupt situation), “-1” (it was a poor performer), “0” (it was an average performer), “+1” (it was a good performer) and “+2” (it was an outstanding performer).

Codification is measured using data on the number of different post-acquisition processes developed in the firm that address areas such as financial evaluation, due diligence, conversion of information systems, human resources integration and sales/product integration. In each of these areas, there is the potential that a manual, or specific support systems, will codify the procedures needed for effective integration of an acquired firm. The extent to which a firm actually has these procedures written down in manuals and support systems that can be identified and put to use in the post-acquisition management phase was revealed to be a good proxy for codified knowledge in our field work. The actual measure of

codification is expressed in terms of the number of manuals developed in the year of the acquisition, divided by the total number currently available. This measure captures the state of codification of post-acquisition management practice in the firm at the time of the acquisition. The acquisition-specific tools for which the Acquiring Bank Questionnaire collected information as to their existence and time of creation are:

Documents/Manuals: Due Diligence check-list, Due Diligence manual, Systems conversion manual, Affiliation/integration manual⁴, Systems training manual⁵, Products training manual⁶,

Quantitative Models: Financial evaluation, Staffing models, Product mapping⁷, Training/Self-training packages, Project management⁸.

Experience Trajectories are operationalized using stocks of both generalized and specialized acquisition activity.

- *The level of general acquisition experience*, a simple count of the number of acquisitions previously completed by the same acquirer.
- *The specific type of experience trajectory*. It measured the number of a specific type of acquisitions completed before the one considered. The criteria used in the present analysis was the degree of relatedness (number of “in-market” and “out-market” acquisitions), as it allows for a straightforward interpretation of the effect of homogeneity among past experiences. Of course, in-market acquisition experiences are considered inherently more homogeneous than out-market ones.

The Model

The model being tested in this study is specified as follows:

⁴ Manual describing all the procedures necessary to accomplish the desired level of integration between the two organizations. It usually covers issues such as human resources, accounting, audit, CRA etc..

⁵ Manual describing how to train the D.P. users at the acquired company. A “train-the-trainer” tool

⁶ Manual describing how to train the sales-force at the acquired company

⁷ Allows thorough comparison of the features of the acquired bank’s products with those of the acquirer.

⁸ Assigns tasks, requirements and deadlines, allowing careful planning and control of complex projects.

Change in ROA = f (Relatedness, resource quality, integration, replacement, codification, tacit knowledge accumulation, codification*integration, control variables)

The analytical method used is ordinary least squares regression. Since codification and integration are highly correlated with their interaction term, we use the z-scores representing their values which are then multiplied to create the interaction term. This eliminated any multicollinearity problem in the estimated model (Variance Inflation Factor was lower than 3 for all the covariates).

5. RESULTS

Table 1 reports descriptive statistics and the correlation matrix on the data used in this study. Table 2 reports the results of a regression analysis of the model described above, along with some controls (acquirer's asset size, acquisition's relative size and number of acquisitions completed in the same year). Three models are presented in Table 2, varying solely for the experience trajectory utilized: Model 1 incorporates a general experience variable (total number of M&A previously completed), while Models 2 and 3 utilize specific experience trajectories built on the basis of horizontal (in-market) and market extension (out-market) type of acquisitions.

Overall, the models exhibit a strong fit with the data, with very large and significant F-statistics and adjusted R-squared statistics varying from 47.1% to 51.6%..

The results indicate that hypothesis 1 positing the positive relationship between codification and performance is not supported. This lack of support may indicate that codification by itself is not sufficient to directly impact performance. This conclusion is confirmed by the fact that the interaction term between the level of integration and knowledge codification is positively and significantly associated with performance, supporting hypothesis 6. The result suggests that high codification of post-acquisition processes does have a positive effect on the performance of highly complex (i.e. high

integration) post-acquisition processes, but if enacted in the context of simpler, low integration, ones, it can turn into excessive bureaucratic load, therefore harming process performance.

The accumulation of tacit knowledge through the exposure to acquisition experiences results to be a significant factor explaining acquisition performance, but only if the experience trajectories are constituted by types of transaction which are highly homogeneous among themselves, such as horizontal (in-market) acquisitions. The pattern is also confirmed by the binary correlations reported in Table 1, where only the experience trajectory built from the accumulation of in-market acquisition experiences is strongly and positively associated with the variation in ROA. Therefore, hypothesis 2 is not supported, while hypothesis 3 is.

The analysis also strongly supports hypothesis 4, which suggests that the level of integration is positively associated with changes in performance. Hypothesis 5 is also confirmed to hold true with large and negative coefficients of the degree of replacement of the top management team. This result has strong implications for the argument that acquisitions are ways to replace inferior management teams with better ones.

6 CONCLUSIONS

In this paper, we have examined the factors which impact post-acquisition performance in the context of horizontal and market extension acquisitions. Regarding the level of integration of the acquisition, the results of the analysis clearly indicate that high levels of integration are positively related to acquisition performance. Although the prior literature relating the level of integration to performance is quite equivocal, this result suggests that, at least in a consolidating industry, the benefits from making acquisitions are reaped to a higher degree as the firms are integrated to a greater extent.

Regarding the degree of replacement of top management, however, the results are not consistent with the view that replacing top management has beneficial effects on performance. In fact, our results show that, controlling for the quality of the pre-acquisition performance of the target, high levels of replacement of top management has negative implications for performance. Since this is a study that tracks changes in performance three years after the acquisition, the result here measures longer term effects of top management replacement and confirms Cannella and Hambrick's (1993) findings.

The knowledge based variables in the model had very intriguing effects on performance. In our theoretical section, we had proposed the notion of organizational capability as the joint outcome of both tacit and articulated knowledge accumulation mechanisms, with the former represented by the accumulation of acquisition experience, and the latter expressed in terms of codification of post-acquisition management processes.

Tacit knowledge accumulated from prior acquisitions positively influenced post-acquisition performance if experiences are highly homogeneous. Completing a large number of market-extension and, eventually, product-extension acquisitions, then, might not help creating and developing an acquisition management capability. Learning curve effects in the context of highly infrequent and heterogeneous events, then, are heavily taxed by the possibility of making erroneous generalizations from the lessons learned in one context to the application of seemingly similar but inherently different domains (Cormier & Hagman, 1987; Haleblan & Finkelstein, 1998a and 1998b).

Codified knowledge seems to be an important enabler of superior performance in that it combines with the level of integration to further improve results, *ceteris paribus*. Interestingly, though, the analysis shows that there might be an optimum level of codification with respect to the degree of integration: codifying low integration processes is not only futile, but can also be harmful to the success of the acquisition. Another interpretation of this finding consists in a possible mediating role played by

post-acquisition decisions between knowledge codification and acquisition performance. Zollo (1998b) shows that knowledge codification is a positive and significant antecedent for both the level of integration and the degree of replacement of top managers. Given the opposite signs of the performance implications of the two decisions (positive for the level of integration and negative for the degree of replacement), though, it might very well be that the direct effect of codification on performance is non-significant because the two mediating terms cancel each other's influence.

A key presumption in the literature on managing acquisitions is that acquirers do not make significant gains from acquisitions, on average. These findings are also consistent in the banking industry, as Rhoades (1994) reports in his survey of 40 studies on bank acquisitions and performance. In our study as well, we find that the average benefits to the acquiring firm from acquisitions is statistically non-distinguishable from zero. The focus of this study on determinants of higher or lower performance from acquisitions attempts to (1) shift the focus of the debate from a concern with the value creation/destruction implications of acquisitive activities to the analysis of the conditions under which value creation is more likely than destruction, and (2) bridge the concern of much of the organizational learning literature about the identification and measurement of the effectiveness of learning mechanisms with the interest in determining the conditions for achieving and sustaining competitive advantage, at the core of the strategic management literature.

We also introduced the type of acquisition (horizontal or market extension) as an important control variable in the analysis. The lack of effect of type of acquisition on performance is an interesting result as well. Ex ante, one could argue that a horizontal acquisition of a competitor in the same geographic area would have high potential economies of scale. However, one could also argue that such acquisitions would have a more complex integration process in terms of the number of potential overlaps of resources and activities across the organizations and the consequently large array of

simultaneous, interdependent decisions and action steps necessary to accomplish the integration of overlapping resources and activities. The finding suggests that the characteristics of pre-acquisition resources do not necessarily predict post-acquisition performance; it is the set of post-acquisition decisions about the manipulation of those resources, and the capability to do so eventually developed by the acquiring firm, that seem to matter most.

It is important to note, however, that our sample does not include, by design, product extension and unrelated acquisitions, so the range of variation on acquisition type is less extensive than most other studies. The economic logic arguing for superior performance implications of related acquisitions, however (essentially cost efficiencies from elimination of redundant resources), should work also in the comparison between horizontal and market-extension type of transactions.

This study has other limitations. First, it is an industry-level study, and therefore its applicability to other industries needs to be closely examined. However, we feel that the banking industry is indicative of many other industries that are experiencing reasonably frequent acquisition activity as they consolidate because of deregulation pressures, such as telecommunications, defense, and other sectors of the financial services industry, or because of acquisitive growth pursued by a subset of incumbents, such as the retailing industry. Second, we used operating performance measures, adjusting for industry level performance. Given the nature of the problem we addressed (post-acquisition integration decisions and related capabilities), it was not possible to use market measures of performance based on stock price reactions at the time of the announcement. Our measures are however consistent with the most fine-grained operating performance measures used in acquisition studies (Rhoades, 1994; Pilloff & Santomero, 1997). To the extent that there would be noise in the measures, we feel that this limitation is offset by the substantial R-squared statistics reported in our models.

This study of acquisitions is an initial exploration of the mechanisms underlying the development of organizational capabilities under “extreme” conditions of rarity and heterogeneity of experiences. More studies are needed to verify the results presented and to replicate similar designs in different but similarly challenging contexts, such as the management of alliances or of internal restructuring processes.

**Table 1 – Means
and Correlations**

	VARIABLES	Avg	Std	1	2	3	4	5	6	7	8
1	Acquisition Performance Ch. In ROA	.0284	.725								
2	Resource relatedness In-market acq.)	.62	.48	.168 ***							
3	Resource quality	-.0354	1.08	-.111 *	-.207 ***						
4	Integration	2.639	.697	.238 ***	.398 ***	-.221 ***					
5	Replacement	1.77	1.27	-.229 ***	.357 ***	-.318 ***	.415 ***				
6	Knowledge codification	.671	.421	.139 **	.049	.126 ***	.161 ***	.050			
7	General M&A experience	11.20	10.16	.036	.167 ***	.037	.116 **	-.053	.391 ***		
8	Experience in in-mkt M&A	5.955	6.802	.453 ***	.257 ***	-.021	.192 ***	.013	.401 ***	.811 ***	
9	Experience out-mkt M&A	4.996	5.571	-.097	-.036	.050	-.074	-.114 **	.222 ***	.714 ***	.321 ***

Pearson's correlation. Significant at the 0.01 (***) , 0.05(**) or 0.10 (*) level

Table 2: Performance Change Results with different types of experience
Model 1: aggregated experience;
Model 2: in-market or horizontal acquisition experience;
Model 3: out-market or market extension acquisition experience
Dependent Variable: CHANGE IN ROA (3 years after acq.)

VARIABLE	Model 1	Model 2	Model 3
Resource-Based Factors			
Resource relatedness	0.080	0.052	0.087
Resource quality	-0.157***	-0.152***	-0.157***
Post-acquisition Decisions			
Level of integration	0.295***	0.287***	0.251***
Degree of Replacement	-0.257***	-0.286***	-0.252***
Knowledge Based Factors			
Knowledge Codification	0.034	-0.01	0.059
<i>Acquisition Experience</i>	<i>0.045</i>	<i>0.285***</i>	<i>-0.089</i>
Interaction Effects			
Codification X Integration	0.205***	0.188***	0.179***
Controls			
Relative Acquisition Size	0.104*	0.113**	0.091
# Acquisitions in Yr. 0	0.483***	0.393***	0.507***
Acquirer Size	-0.065	-0.06	-0.05
F test	18.298***	21.603***	18.769***
Adjusted R-squared	0.471	0.516	0.479
d.f. residual	184	183	183

Standardized Beta coefficients reported. Significant at the 0.01 (***), 0.05(**) or 0.10 (*) level

REFERENCES

- Agrawal, A., Jaffe, J. F. & Mandelker, G. N. 1992. The post-merger performance of acquiring firms: a re-examination of an anomaly. *The Journal of Finance*, 47(4): 1605-1621.
- Anand, J. & Singh, H. 1997. Assets redeployment, acquisition and corporate strategies in declining industries. *Strategic Management Journal*, 18 (Summer Special Issue): 99-118.
- Amburgey, T.A., Kelly, D. & Barnett, W.P. 1993. Resetting the clock: the dynamics of organizational change and failure. *Administrative Science Quarterly*, 38: 51-73.
- Arrow, K. J. 1962b. Economic welfare and the allocation of resources for invention. In **The Rate and Direction of Inventive Activity**, ed. R. Nelson. Princeton: Princeton University Press.
- Arrow, K. J. 1974. **The Limits of Organization**. New York: Norton.
- Astrachan, J. H. 1990. **Mergers, Acquisitions, and Employee Anxiety: A Study of Separation Anxiety in a Corporate Context**. New York, NY: Praeger.
- Baum, J.A.C, & Ginsberg, A., 1997. Acquisition experience and profitability: exploring the value of learning by doing. Unpublished manuscript, New York University.
- Barney, J.B. 1988. Returns to bidding firms in mergers and acquisitions: reconsidering the relatedness hypothesis. *Strategic Management Journal*, 9 (Special Issue): 71-78.
- Buono, A.F. & Bowditch, J.L. 1989. *The human side of mergers and acquisitions*. San Francisco, CA: Jossey-Bass.
- Cannella, A. A. Jr. & Hambrick, D. C. 1993. Effects of executive departures on the performance of acquired firms. *Strategic Management Journal*, 14: 137-152.
- Capron, L., Dussauge, P. & Mitchell, W., 1998. Resource redeployment following horizontal acquisitions in Europe and North America, 1988-1992. *Strategic Management Journal*, 19(7): 631-663.
- Chang, S.J. 1995. International expansion strategy of Japanese firms: capability building through sequential entry. *Academy of Management Journal*, 38: 383-407.
- Chatterjee, S. 1986. Types of synergy and economic value: the impact of acquisitions on merging and rival firms. *Strategic Management Journal*, 7: 119-139.
- Chatterjee, S. & Lubatkin, M. Schweiger, D.M. & Weber, Y. 1992. Cultural differences and shareholder value in related mergers: Linking equity and human capital. **Strategic Management Journal**, 13: 319-344.
- Clark, K. & Fujimoto, 1991. *Product development performance*. Harvard Business School Press, Boston, MA.

- Cohen, W. M. & Bacdayan, P. 1994. Organizational routines are stored as procedural memory: Evidence from a laboratory study. **Organization Science**, 5(4): 554-568.
- Cohen, W. M., Burkhart R., Dosi G., Egidi M., Marengo L., Warglien M. & Winter S. 1996. Routines and other recurring action patterns of organizations: contemporary research issues. Working paper IIASA 96-25 (March), also of Santa Fe Institute (Nov. 1995).
- Cohen, W. M. & Levinthal, D. A. 1990. Absorptive capacity: a new perspective on learning and innovation. **Administrative Science Quarterly**. 35: 128-153.
- Cormier, S. & Hagman, J. 1987. **Transfer of Learning: Contemporary Research and Applications**. Academic Press Inc: San Diego.
- Cyert, R. M. & March, J. G. 1963. **A Behavioral Theory of the Firm**, Prentice-Hall, Englewood Cliffs, NJ.
- Datta, D.K. 1991. Organizational fit and acquisition performance: effects of post-acquisition integration. **Strategic Management Journal**, 12: 281-297.
- Datta, D. K. & Grant, J. H. 1990. Relationships between type of acquisition, the autonomy given to the acquired firm, and acquisition success: an empirical analysis. **Journal of Management**, 16(1): 29-44.
- Deming, W.E., 1982. **Quality, Productivity, and Competitive Position**. MIT Center for Advanced Engineering Study, Cambridge.
- Dierickx, I. & Koza M. 1991. Information asymmetries. How not to buy a lemon in negotiating mergers and acquisitions. **European Management Journal**, 9(3).
- Dosi, G. 1982. Technological paradigms and technological trajectories: a suggested interpretation of the determinants and directions of technical change. **Research Policy**, 11(3): 147-162.
- Dutton, J.M. and A. Thomas, 1984. Treating Progress Functions as a Managerial Opportunity, **Academy of Management Review**, 9; 235-247.
- Epple, D., L. Argote & R. Devadas, 1991. Organizational Learning Curves: A Method for Investigating Intra-plant Transfer of Knowledge Acquired Through Learning By Doing, **Organization Science**, 2; 58-70.
- Fowler, K.L. & Schmidt D.R. 1989. Determinants of tender offer post-acquisition financial performance. **Strategic Management Journal**, 10: 339-350.
- Franks, J., Harris R. & Titman S. 1991. The post-merger share price performance of acquiring firms. **Journal of Financial Economics**, 29: 81-96.

- Gavetti, G. & Levinthal, D. 1998. Looking forward and looking backward: cognitive and experiential search. Unpublished Working paper, The Wharton School.
- Grant, R. M. 1996. Toward a knowledge-based theory of the firm. *Strategic Management Journal*, 17 (Winter Special Issue): 109-122.
- Haleblian, J. & Finkelstein, S. 1998a. Understanding acquisition performance: The role of transfer effects. Unpublished paper. University of California at Riverside.
- Haleblian, J. & Finkelstein, S. 1998b. The influence of organization acquisition experience on acquisition performance: a behavioral learning theory perspective. Forthcoming, *Administrative Science Quarterly*.
- Haspeslagh, P.C. & Jemison, D.B. 1991. *Managing acquisitions*. New York: Free Press.
- Haunschild, P.R. 1994. How much is that company worth ? Interorganizational relationships, uncertainty and acquisition premiums. Working paper, Univ. of Wisconsin-Madison.
- Haveman, H.A. 1992. Between a rock and a hard place: organizational change and performance under conditions of fundamental environmental transformation. *Administrative Science Quarterly*, 37: 48-75.
- Haveman, H.A. 1993. Organizational size and change: diversification in the savings and loans industry after deregulation. *Administrative Science Quarterly*, 38: 20-50.
- Healy, P.M., Palepu K. & Ruback R.S. 1992. Does corporate performance improve after mergers ? *Journal of Financial Economics*, 31: 135-175.
- Healy A.F. & Bourne L.E., 1995. *Learning and memory of knowledge and skills*. Sage Publications
- Henderson, R.M. & K. B. Clark, 1990. Architectural innovation: The reconfiguration of existing product technologies and the failure of established firms. *Administrative Science Quarterly*, 35: 9-30.
- Iansiti, M. 1995. Technology integration: Managing technological evolution in a complex environment. *Research Policy*, 24(4): 521-542.
- Jarrell, G.A., Brickley J.A. & Netter J.M. 1988. The market for corporate control: the empirical evidence since 1980. *Journal of Economic Perspectives*, 2: 49-68.
- Jemison, D.B. & Sitkin, S.B. 1986. Corporate acquisitions: a process perspective. *Academy of Management Review*, 11: 145-163.
- Jensen, M.C. & Ruback, R.S. 1983. The market for corporate control: the scientific evidence. *Journal of Financial Economics*, 11: 5-50.
- Kitching, J. 1967. Why do mergers miscarry ? *Harvard Business Review*, 45(6): 84-102.
- Kogut, B. & Chang, S.J., 1994. Technological capabilities and Japanese foreign direct investment in the

United States. *Review of Economics and Statistics*, 73: 401-413.

Kogut, B & Zander U. 1992. Knowledge of the firm, combinative capabilities and the replication of technology. *Organization Science*, 3(3): 383-397.

Krishnan, H.A., Miller, A., and Judge, W.Q. 1997. Diversification and top management team complementarity: is performance improved by merging similar or dissimilar teams? *Strategic Management Journal*, 18: 361-374

Levitt, B. & March, J. G. 1988. Organizational learning. *Annual Review of Sociology*, 14: 319-340.

Levinthal, D.A. & March, J.G. 1993. The myopia of learning. *Strategic Management Journal*. 14: 94-112.

Lippman, S. & Rumelt, R. 1982. Uncertain imitability: An analysis of inter-firm differences in efficiency under competition. *Bell Journal of Economics*, 13 (Autumn): 418-438.

Loderer, C. & Martin. K. 1992. Post-acquisition performance of acquiring firms. *Financial Management*, Autumn: 69-79.

Lubatkin, M. 1987. Merger strategies and stockholder value. *Strategic Management Journal*, 8: 39-53.

Manne, H. G. 1965. Mergers and the market for corporate control. *Journal of Political Economy*, 73-74: 110-120.

March, J.G., 1991. Exploration and exploitation in organizational learning. *Organization Science*. 2: 71-87.

March, J.G. & Simon H. 1958. *Organizations*. New York: Wiley.

March, J.G., Sproull L.S. & Tamuz M, 1991. Learning from samples of one or fewer. *Organization Science*, 2(1): 1-13.

Marks, M.L. and Mirvis, P.H. 1985. Merger syndrome: stress and uncertainty. *Mergers and Acquisitions*, Summer 1985: 50-55.

Mirvis, P.H., and Marks, M.L. 1992. *Managing the merger: making it work*. Englewood Cliffs, NJ: Prentice-Hall.

Nelson, R. & Winter, S. 1982. *An evolutionary theory of economic change*. Cambridge, MA: Harvard University Press.

Nonaka, I 1994. A dynamic theory of knowledge creation. *Organization Science*, 5(1), 14-37.

Ocasio, W. 1997. Towards an attention-based view of the firm. *Strategic Management Journal*, 18 (Summer Special Issue): 187-206.

- Pablo, A.L. 1994. Determinants of acquisition integration level: a decision-making perspective. *Academy of Management Journal*, 37(4): 803-836.
- Pablo, A. L., Sitkin, S. B. & Jemison, D. B. 1996. Acquisition decision-making processes: The central role of risk. *Journal of Management*, 22(5): 723-746.
- Pennings, J.M., Barkema, H. & Douma, S. 1994. Organizational learning and diversification. *Academy of Management Journal*, 37(3): 608-640.
- Pilloff, S. J. & Santomero, A. M. 1997. The value effects of bank mergers and acquisitions. In *Mergers of financial institutions* (ed.) Y. Amihud and G. Miller. Irwin Professional Publications, New York (forthcoming).
- Polanyi, M. 1962. *Personal knowledge: toward a post-critical philosophy*. New York: Harper Torchbooks.
- Polanyi, M. 1966. *The Tacit Dimension*. New York: Anchor Day Books.
- Porter, M. 1987. From competitive advantage to corporate strategy. *Harvard Business Review*, (5): 43-59.
- Rhoades, S. A. 1994. A summary of merger performance studies in banking, 1980-93, and assessment of the "operating performance" and "event study" methodologies.
- Rogers, E. 1980. *Diffusion of innovation*. New York, Free Press.
- Romanelli, E. & Tushman, M. L. 1994. Organizational transformation as punctuated equilibrium: an empirical test. *Academy of Management Journal*, 37(6): 1141-1166.
- Rumelt, R. P. 1974. *Strategy, structure and economic performance*. Division of research. Graduate school of business administration. Harvard University.
- Rumelt, R.P. 1984. Towards a strategic theory of the firm. In: R.B. Lamb (ed.) *Competitive strategic management*: 556-570. Engelwood Cliffs, NJ: Prentice Hall.
- Sanchez, R. & Mahoney, J. T. 1996. Modularity, flexibility, and knowledge management in product and organization design. *Strategic Management Journal*, 17 (Winter Special Issue): 63-76.
- Sanchez, R. & Heene, 1997. *Strategic learning and knowledge management*. John Wiley & Sons,
- Schweiger, D.M., Ivencevich, J.M., and Power, F.R. 1987. Executive actions for managing human resources before and after acquisition. *Academy of Management Executive*, Vol. 1:127-138.
- Schweiger, D. M. & DeNisi, A. S. 1991. Communication with employees following a merger: A longitudinal field experiment. *Academy of Management Journal*, 34: 110-135.

- Seely Brown, J. & Duguid, P 1991. Organizational learning and communities of practice: Toward a unified view of working, learning and innovation. **Organization Science**, 2(1): 40-57.
- Seth, A. 1990. Sources of value creation in acquisitions: an empirical investigation. **Strategic Management Journal**, 11: 431-446.
- Shanley, M.T. 1987. Post-acquisition management approaches: an exploratory study. Unpublished doctoral dissertation. University of Pennsylvania.
- Shanley, M.T. 1994. Determinants and consequences of post-acquisition change. In: G. Von Krogh, A. Sinatra & H. Singh (eds.). **Managing Corporate Acquisitions: A Comparative Analysis**: 391-413. London, UK: McMillan Press.
- Shelton, L.M. 1988. Strategic business fits and corporate acquisitions: empirical evidence. **Strategic Management Journal**, 9(3): 279-88.
- Singh, H. & Montgomery, C.A. 1987. Corporate acquisition strategies and economic performance. **Strategic Management Journal**, 8(4): 377-86.
- Szulanski, G. 1993. Intra-firm transfer of best practice, appropriative capabilities, and organizational barriers to appropriation. **Academy of Management Best Papers Proceedings**, 47-51.
- Szulanski, G. 1997. Exploring internal stickiness: Impediments to the transfer of the best practice within the firm. **Strategic Management Journal**, 17 (Winter Special Issue): 27-44.
- Teece, D.J., Pisano G. & Shuen A. 1997. Dynamic capabilities of and strategic management, **Strategic Management Journal**, 18(7): 509-533.
- Tushman, M. L. & Romanelli, E. 1985. Organizational evolution: A metamorphosis model of convergence and reorientation. **Research in Organizational Behavior**, 7: 171-222.
- Von Hippel, E. and M.J. Tyre, 1995. "How Learning by Doing is Done: Problem Identification in Novel Process Equipment," **Research Policy**, 24; 1-12
- Walsh, J. P. 1988. Top Management Turnover Following Acquisitions. **Strategic Management Journal**, 9(2): 173 - 183.
- Walsh, J. P. & Ellwood J.W. 1991. Mergers, acquisitions and the pruning of managerial deadwood. **Strategic Management Journal**, 12(3): 201-217.
- Weick, K. 1979. **The Social Psychology of Organizing** (2nd ed.). Reading, MA: Addison-Wesley.
- Wernerfelt, B. 1984. A resource-based view of the firm. **Strategic Management Journal**, 5(2): 171-180.
- Winter, S. 1987. Knowledge and Competence as Strategic Assets. In D.J. Teece (ed.), **The competitive**

Challenge: Strategies for Industrial Innovation and Renewal: 159-184. Cambridge, MA: Ballinger.

Winter, S. 1995. Four Rs for profitability: rents, resources, routines and replication. In C.A. Montgomery (ed.), **Resource-based and Evolutionary Theories of the Firm: Towards a Synthesis:** 147-178. Norwell, MA.

Yelle, L.E., 1979. "The Learning Curve: Historical Review and Comprehensive Survey," *Decision Sciences*, 10; 302-328

Zander, U. & Kogut, B. 1995. Knowledge and the speed of transfer and imitation of organizational capabilities: an empirical test. *Organization Science*, 6(1): 76-92.

Zollo, M. 1998a. "Knowledge codification, process routinization and the creation of organizational capabilities: post-acquisition management in the US banking industry". Unpublished dissertation, University of Pennsylvania.

Zollo, M. 1998b "Strategies or routines ? Codification, Replication and the Evolution of Post-Acquisition Integration Practices", working paper, the Wharton Financial Institutions Center and INSEAD.