The Evolution of Cooperation in Strategic Alliances: Initial Conditions or Learning Processes?
Author(s): Yves L. Doz
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THE EVOLUTION OF COOPERATION IN STRATEGIC ALLIANCES: INITIAL CONDITIONS OR LEARNING PROCESSES?
YVES L. DOZ
INSEAD, Fontainebleau, France

We examine how the learning, along several dimensions (environment, task, process, skills, goals), that takes place in strategic alliances between firms mediates between the initial conditions and the outcomes of these alliances. Through a longitudinal case study of two projects in one alliance, replicated and extended in another four projects in two alliances, a framework was developed to analyze the evolution of cooperation in strategic alliances. Successful alliance projects were highly evolutionary and went through a sequence of interactive cycles of learning, reevaluation and readjustment. Failing projects, conversely, were highly inertial, with little learning, or divergent learning between cognitive understanding and behavioral adjustment, or frustrated expectations. Although strategic alliances may be a special case of organizational learning, we believe analyzing the evolution of strategic alliances helps transcend too simple depictions of inertia and adaptation, in particular by suggesting that initial conditions may lead to a stable ‘imprinting’ of fixed processes that make alliances highly inertial or to generative and evolutionary processes that make them highly adaptive, depending on how they are set.

INTRODUCTION

This paper explores the evolution of cooperation in strategic alliances between firms, and in particular how this evolution is constrained by the conditions at the inception of the alliance and influenced by the collaboration process that takes place subsequently. My motivation for this paper is twofold: (1) to remedy what is seen as a dearth of research on the evolution of strategic alliances (in contrast to abundant research on the conditions that lead to their creation) and (2) to draw implications that contribute to transcend the somewhat sterile debate, in the strategic management field, between teleological and evolutionary views of firms’ commitment to courses of action (Van de Ven, 1992) by exploring the roles various types of learning play in alliance evolution.

Key words: strategic alliances; cooperation on cooperative strategies; organizational learning; strategy process; interdependencies

The growing literature on the strategic alliance phenomenon suffers from imbalance. While the importance of evolutionary processes is well recognized in many subfields of management and of organization theory (see for instance Burgelman, 1991, 1994; Baum and Singh, 1994; Teece, Pisano, and Shuen, 1997), studies of strategic alliances as evolutionary processes are scarce. (Most notable are Ring and Van de Ven, 1992, and Larson, 1992.) Most researchers have focused either on explaining patterns of alliance formation (e.g. Gabrielli, 1986; Haklisch, 1986; Hergert and Morris, 1986; Porter and Fuller, 1984; Pisano, 1987; Tyebjee, 1988; Doz, 1992) or on relating alliance outcomes to initial characteristics of the alliance or of its partners (e.g. Burgers, Hill, and Kim, 1993; Hagedoorn and Schakenraad, 1994). Even the most clinically oriented process studies (e.g., Hamel, 1991) have a strong deterministic bias where initial alliance conditions and partners’ characteristics define alliance outcomes. Their implicit assumption has been that alliances typi-
cally correspond to the implementation of clear-cut strategic objectives to be achieved via the alliance (e.g., Lorange, 1985; Root, 1988; Killing, 1988).

While researchers who studied interorganizational relationships point to the process issues involved in the relationship (e.g., Pfeffer and Nowak, 1976; Kochan, 1975; Zeitz, 1980; Shortell and Zajac, 1988) or suggest approaches to managing the coordination process (e.g., Whetten, 1981) their analysis remains at the level of conceptual development or cross-sectional analysis, and fails to capture empirically the process dynamics of collaboration (e.g., Mohr and Spekman, 1994). Most researchers focus on the determinants of cooperation and/or on the contractual or relational form of cooperation (Oliver, 1990; Ring and Van de Ven, 1992) or, occasionally, on outcome, but with little attention to process (Hagedoorn and Schakenraad, 1994). Only Van de Ven and Walker (1984) and more recently Ring and Van den Ven, (1994) develop an explicit model of the evolution of interorganizational coordination. Game theorists point to interesting evolutionary features of behavior in cooperation experiments (e.g., Axelrod, 1984), but the applicability of their analysis to interorganizational relationships remains untested. The field has also suffered from a lack of research spanning the individual behaviors and the organizational processes, i.e., a lack of integration of individual behaviors in their organizational context.

Yet, the importance of the collaboration process itself is acknowledged by some researchers. In a study of organizational learning through joint ventures, Lyles (1988) argues that ‘the initial contracts, legal statements or agreements focused attention on the wrong set of issues.’ Hamel (1991) makes a similar point. Although their statistical analysis does not fully confirm their propositions, Shortell and Zajac (1988), point to the importance of process variables in explaining performance of joint ventures between doctors and hospitals. Westney (1988) distinguishes substantive learning in alliances, adding to the skills and knowledge of the firm and process learning about managing the cooperation itself. Kogut (1988) considers how learning goals influence the choice of mode for interorganizational cooperation. Balakrishnan and Koza (1993) point to the role of joint learning in reducing adverse selection through alliances.

Little systematic attention has been paid by researchers, however, to the unfolding of the cooperation process itself in researching interfirm cooperation. Our approach is clearly in the ‘opening the black box’ tradition by considering how learning processes in alliances mediate between initial conditions and outcomes. Little research has examined how organizations adjust their level, mode, and commitment to cooperation over time as a result of learning feedback endogenous to the cooperation process, and how therefore we may need to include process descriptor variables between the initial intents and characteristics of strategic alliances among firms and their actual outcomes. The area is in need of grounded empirical research (Parkhe, 1993a).

This paper aims to contribute to fill that gap by reporting research on the evolution of collaborative projects in the context of major strategic alliances between firms. The focus of the analysis is on the conditions fostering or blocking interpartner learning in these collaborative projects, and on the impact of learning on their evolution.

More broadly the paper attempts to assess the relative contributions of initial conditions and of evolutionary learning processes to the outcomes of strategic alliances. Although strategic alliances are perhaps a special case where sustained organizational interactions between two or more firms may lead to patterns of coevolution between these firms that depend largely on the process of cooperation, we believe nonetheless that studying the evolution of cooperation in strategic alliances can shed light on the wider issues of teleological strategy implementation vs. evolutionary strategic adaptation and contribute to transcend the simple (and sometimes simplistic) debate to reconcile the two perspectives. In particular, we do expect alliance situations to be characterized by both strong adaptive and strong inertial forces. The interaction with a ‘foreign’ partner challenges an organization to adapt more strongly than arm’s length transactions. Yet, that very challenge may trigger defensive mechanisms that are inertial! Analyzing the unfolding of events at the interface between partners should reveal and highlight tensions between adaptation and inertia. Empirically, the central issue we investigate is whether firms adapt their collaboration in an alliance to learning and feedback within the alliance, or merely implement, with little adjustment and evolution over time, the initial alliance design, toward set objectives.
The first section describes the research design and the empirical fieldwork. In the tradition and spirit of grounded theory development, the second and main section draws on the data from our first research site, and more selectively on a contrast between the various sites, to develop a process framework of the evolution of alliances which reveals patterns of interaction between initial conditions, learning processes, reevaluation and adjustment on the part of the alliance partners and outcomes. The final section draws implications and points to limitations and possible further research.

**METHODS AND DATA**

Among the many types of strategic alliances, we selected only cases of new business and new product development, on the assumption that they would offer a relatively balanced situation for both initial conditions and process variables to play a role in affecting outcomes, as compared to both more traditional resource access or market entry joint ventures where the initial conditions of the transaction may largely determine outcomes (Hennart, 1988; Buckley and Casson, 1988; Parkhe, 1993b) and very uncertain research collaboration ventures where process issues may dwarf initial conditions in influencing outcomes (Gibson & Rogers, 1994). While access considerations did not allow to hold the industry external environment meaningfully constant, the individual projects studied all involved the combination of skills between the partners to pursue a new opportunity subject to significant market and technical uncertainties which could only be resolved over time rather than at the inception of the relationship.

A nested approach to individual cases was used, by selecting two projects within each of three multipoint alliances. This allowed us to distinguish between project-level, alliance-level, and corporate-level data and analysis. Each case study thus focused on one particular product area, and on one product partnership within that area, two such product partnerships being researched in each alliance.

**Research settings**

A brief introduction to each of the three main research cases is provided below.

**Ciba Geigy–Alza**

Between 1977 and 1982, Alza and Ciba Geigy collaborated in the development of advanced drug delivery system (ADDS) applications, combining Alza’s expertise in ADDS and Ciba Geigy’s experience of pharmaceutical development, production and marketing. In particular, they worked on two technologies: oral slow-release pills (OROS in short) and transdermal patches (TTS in short). Alza was to do the research and advanced development, Ciba Geigy the registration, production and marketing. Alza was a small entrepreneurial organization based in Palo Alto (California), Ciba Geigy a major chemicals and pharmaceuticals multinational, based in Basel (Switzerland). Ciba Geigy took an equity position in Alza and the two companies were also linked by a series of research and marketing contracts.

**AT&T–Olivetti**

Between 1983 and 1989, AT&T and Olivetti collaborated in various product areas, most notably mini- and microcomputers. Some of their efforts were mere product trades, for instance for typewriters and existing microcomputers; others involved the development of a new UNIX-based range of minicomputers and a new generation of microcomputers. These are the two projects we reported on in this paper. At the time of the alliance, following divestiture of the regional telephone operating companies, AT&T was trying to internationalize its operations and to enter the computer industry. Olivetti is the leading Italian supplier of computers and office electronics. Most of the joint efforts between them took place between 1984 and 1986.

**GE–SNECMA**

Starting in the late 1960s, and continuing today, General Electric and SNECMA collaborated closely in the civilian jet engine business. The collaboration started with SNECMA being a minority partner in GE’s large engine program (the CF6). This initial project was followed by a joint program to develop and manufacture a midrange engine, the CFM56, started in 1973 and first commercialized in 1979. SNECMA is the major French manufacturer of aircraft engines. GE was a major manufacturer of turbines and of jet
engines for the US military at the beginning of
the alliance, and has since gained leadership of
the U.S. aircraft engine industry against Pratt &
Whitney.

Data sources
The clinical studies drew both on archival data
and on interviews of participants in the
cooperation process at both partner firms. To
make access to data easier, a clear trade-off was
made in favor of the retrospective analysis of
relatively recent partnerships over the real time
process study of unfolding partnerships. We took
such an historical perspective also to control for
differences in the collaborative experience of the
companies: in each case the collaboration projects
we studied were the first major strategic partner-
ship in which the partners, or at least the involved
subunits, engaged into. We also observed from
other, real-time, process studies (Prahalad and
Doz, 1987; Doz and Prahalad, 1991; Doz and
Thanheiser, 1993) that it was extremely difficult
to be sure not to influence ongoing processes and
still maintain a legitimate presence in the field
insofar as managers would quickly be tempted to
seek advice from the researcher and ask the
researcher to intervene in the process, as a quid
pro quo for allowing further observations.

The selection process for the interviewees was
simple: when the initial agreement to collaborate
in the research was granted—separately—by each
partner firm, the initial discussions leading to
access also identified the key participants in the
collaboration process. Archival written material
also gave some clues as to who seemed to have
played a key role. We sought to identify three
types of participants: ‘front-line’ day-to-day part-
ners (e.g., development team leaders at Olivetti,
project ‘sponsors’ at Ciba Geigy), more senior
executives who had played a key role (e.g., past
CEOs of the GE–SNECMA joint venture, direc-
tors of Alza appointed by Ciba Geigy) and senior
line managers whose operations were directly
involved in the partnership (typically division
managers in the partner firms). We specifically
sought to interview managers with a lot of first-
hand experience of interaction with the partner,
in particular managers who had been ‘exchanged’
between partners (at least in terms of where they
were located) and managers concerned with the
partnership but with little direct experience. As
the interviews proceeded we asked interviewees
who else we should interview, and typically wid-
ened the number of interviewees substantially,
particularly in the more complex multipoint part-
nerships and larger partner firms, stopping only
when we found only the names of persons already
interviewed as strong suggestions for further interviewees.

As a result of this interactive process, about
20 executives and scientists were interviewed at
Ciba Geigy, in Switzerland and in the U.S.A.
(where part of the interface with Alza was
handled), about 12 at Alza (a much smaller
company), about 15 at both AT&T in the U.S.A.
and Italy and Olivetti, and six at SNECMA and
three at General Electric (given the clear focus of
their alliance). Some executives were interviewed
several times, total interview time per interviewee
ranging from 1 to 8 hours. In all cases extensive
use was made of archival data to prepare inter-
views, challenge interviewees’ memories, and
cross-check their ex post data and perceptions
with the documented trail of the partnership. This
helped us contain the difficulties created by parti-
cipants’ selective retrospective bias (Schwenk,
1986, Golden, 1992) and recreate the manager’s
‘temporal and contextual frame of reference’
(Van de Ven, 1992). Importantly, the document-
ary evidence used was not restricted to the ‘joint’
formal documents (e.g., memoranda of under-
standing, minutes of coordination meetings and
the like) but also included some materials from
the files of each of the partner companies that
reflected their own private analyses, debates and
positions and allowed the ‘hidden agendas’ and
non-discussible positions of the partners vis-à-vis
their partnerships to be traced. This led to inter-
views at multiple levels and for the more organi-
zationally complex partners (AT&T, Ciba Geigy)
in multiple locations.

The focus of each interview was the person’s
own factual experience with the partnership, the
evolution of their involvement, understanding,
commitments and feelings toward the partnership,
their own interactions with members of the part-
ner firms and of their own firm on partnership
matters, and their recollection of ‘events’ that
they saw as important in the evolution of the
partnership. Our emphasis was to comprehend as
fully as we could the events within and around
the partnership and the perceptions of key partic-
ipants in the collaboration process about these
events. Our focus included thus both a general understanding of decisions, perceptions and events and a specific identification of how these were perceived, at various points in time, by key individuals in the collaboration process. Detailed, almost verbatim, notes were taken in the course of the interviews, and transcribed in the hours following the interviews.

Theory building and theory testing

In each of the cases researched, the data were then aggregated in a series of charts, summarizing the evolution of the alliance—or the ‘suballiances’ within the multipoint ones—over time. As we tried to make sense of the streams of data, focusing on the question of ‘what changed over time, and why,’ we mapped the evolution of each partnership chronologically, from the standpoint of each partner (as the learning processes and learning cycles of each partner in each partnership obviously did not necessarily coincide). Tables 1 and 2 present examples of the most aggregated data summaries that were produced, based on detailed within-case analysis once the conceptualization of alliances as interactive and iterative cycles of learning, reevaluation and readjustments was developed. Such maps were drawn both at the individual project level (e.g., Table 1), and at the overall alliance level (e.g., Table 2), for each partner separately and for each alliance jointly. Data analysis followed the usual approaches for qualitative inductive analysis (Eisenhardt, 1989; Glaser and Strauss, 1967; Miles and Huberman, 1984), and the data were structured in chronological sequences organized by the main ‘actors’ in the process and separating action and perception categories.

After the construction of the case histories and chronologies, within-case analysis was conducted to answer the main questions of partnership evolution.

The initial case study, Ciba Geigy–Alza, was used to generate the initial framework in a theoretical generalization theory-building mode (Glaser and Strauss, 1967). The other cases (AT&T–Olivetti, GE–SNECMA) were added to the sample as theoretical replications and extensions (Yin, 1984; Leonard-Barton, 1990) to challenge and refine the initial framework. In these subsequent cases we engaged in both theory testing and theory development. For the theory testing part of the work we relied on qualitative pattern matching between the initial framework and data. Whereas the Ciba Geigy–Alza partnership was seen, by its participants, as having had mixed results, the others were seen, in retrospect, as a failure (AT&T–Olivetti) and a success (GE–SNECMA). We selected these two cases expecting maximum differences in processes, testing the robustness of our framework. Continuation and/or restructuring or discontinuation of the alliance was taken as the dependent variable, to result from a particular array of non-equivalent independent variables characterizing the process of collaboration. The three cases offered the additional benefit of being multipoint partnerships, involving different technologies and products, allowing comparison of process variable differences between the ‘cases within the case’ while holding overall corporate and geographic contexts constant. The fact that some of the individual projects, within the same alliance, were significantly more successful than others allowed significant analysis of project-level conditions, as distinct from partnership or corporate-level conditions.

To avoid confirmatory biases, most of the data collection on AT&T/Olivetti and GE/SNECMA was done by research associates who had not been involved with the initial framework development, and were not deeply familiar with the framework. The comparative cross-case analysis and the consolidation of the data were tested by having one of the researchers not directly involved in the field research at any of the six companies use all of the detailed transcripts of interviews to test the framework. This allowed someone new to both the data and the framework to run an independent test of the pattern matches between the various cases.

In the tradition of inductive grounded theory development, we will use extensively data from our first research site, Ciba Geigy–Alza, to develop more fully the theoretical framework outlined below. We will use data from our other sites to add depth, nuance, or new insights. Our exposition of the data and development of the framework will follow the evolution of the alliances over time.

FINDINGS

A process framework: Overview

Although the framework was developed ex post from the data on the first case (between Alza...
Table 1. Partnership Cycles: AT&T–Olivetti, minicomputers

<table>
<thead>
<tr>
<th>Learning categories</th>
<th>Initial conditions</th>
<th>1984–85</th>
<th>1985–87</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Environment learning</strong></td>
<td>Little understanding of European environment on the part of AT&amp;T</td>
<td>Existing AT&amp;T product line does not sell in Europe (nor in the U.S.A.)</td>
<td>Decision to develop a new product line (NPL) jointly with Olivetti</td>
</tr>
<tr>
<td><strong>Task learning</strong></td>
<td>Assumption of a relatively easy task</td>
<td>Understanding that current marketing of AT&amp;T products will not be sufficient</td>
<td>Need for a tighter interfunctional integration and interpartner coordination is acknowledged</td>
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<tr>
<td></td>
<td>Little perceived need for joint action</td>
<td>Cost and complexity of task perceived as high</td>
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</tbody>
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AT&T-Olivetti, minicomputers
<table>
<thead>
<tr>
<th>Learning categories</th>
<th>Initial conditions</th>
<th>1984–85</th>
<th>1985–87</th>
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<tbody>
<tr>
<td></td>
<td>Learning</td>
<td>Reevaluation</td>
<td>Readjustment</td>
</tr>
<tr>
<td><strong>Process learning</strong></td>
<td>No specific org. interaction process</td>
<td>Deep differences in organizational processes become clear to partners, who tend to be critical of each other</td>
<td>Partners are disappointed with each other, but potential value of the partnership is still seen as high</td>
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<tr>
<td></td>
<td>Contractual agreements</td>
<td>Differences in speed of action also become an issue</td>
<td>AT&amp;T’s control of technology transfer disappoints Olivetti</td>
</tr>
<tr>
<td></td>
<td>Little exchange of personnel</td>
<td>The organizations are too different in their emphasis, AT&amp;T exhibits no learning need</td>
<td>Olivetti’s managers become aware of how little they know about marketing</td>
</tr>
<tr>
<td><strong>Skill learning</strong></td>
<td>High skill complementarity: technology and networks from AT&amp;T, marketing, distribution and specific products from Olivetti</td>
<td>Little skill learning</td>
<td>AT&amp;T’s control of technology transfer disappoints Olivetti</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The organizations are too different in their emphasis, AT&amp;T exhibits no learning need</td>
<td>Olivetti AT&amp;T’s managers become aware of how little they know about marketing</td>
</tr>
<tr>
<td><strong>Partner learning</strong></td>
<td>Goals of the alliance are expressed very broadly at corporate levels</td>
<td>Differences in expectations surface</td>
<td>Olivetti’s top management becomes worried about AT&amp;T’s ability to manage its computer business successfully</td>
</tr>
<tr>
<td></td>
<td>Individual divisions are ‘invited’ to cooperate</td>
<td>Olivetti’s expectations of free access to the whole range of AT&amp;T’s technologies become clear</td>
<td>Olivetti is increasingly reluctant to make binding commitments to AT&amp;T</td>
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</tr>
<tr>
<td>objects</td>
<td></td>
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</tr>
<tr>
<td>Environment learning</td>
<td>Total commitment to ADDS on the part of Alza but poorly targeted initial products. Strong interest by CG to discover how to make ADDS successful</td>
<td>Little learning from outside, too early for external feedback</td>
<td>No significant reaction, but perceived delay in ADDS' acceptance by other companies</td>
</tr>
<tr>
<td>Task learning</td>
<td>Little interdependence between partners. Sequential development. Usual process for development. Part-time sponsors.</td>
<td>Need for interdependence, for OROS in particular (application-specific work). Slow process-only committed mavericks who bypass systems succeed.</td>
<td>Lesser expectations of fast success. Suspicion in CG that there is less to OROS than anticipated. CG's commitment of resources to collaboration needs to increase.</td>
</tr>
<tr>
<td>Process learning</td>
<td>Distance between partners. Infrequent coordination meetings. Little interaction, arm's length relationship.</td>
<td>Alza discovers the bureaucratic and hierarchial nature of CG. With a few exception AZ's style of behavior shocks CG's personnel. Progress is going to be slower than expected. Interaction is going to be more painful than expected.</td>
<td>Alza lobbies and tries to influence individuals within CG to accelerate decisions. Middle managers in CG are not committed. CG personnel resents Alza's behavior and vice versa. More structured interaction is needed. More guidance to the work is needed.</td>
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<tr>
<td><strong>Skill learning</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial conditions</td>
<td>Detailed progress reports by Alza to CG</td>
<td>Little learning on the part of CG—distance, limited contacts; very different behaviors</td>
<td>Little to learn from CG, except management disciplines; concludes AZ OROS may not work easily concludes CG</td>
</tr>
<tr>
<td></td>
<td>CO’s commitment to share information on manufacturing technologies</td>
<td>No learning of skills on the part of Alza</td>
<td>Takeover of ADDS manufacturing by CG</td>
</tr>
<tr>
<td><strong>Partner goal learning</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial conditions</td>
<td>Emphasis on short-term products and financial results</td>
<td>Alza’s strong desire to retain/regain autonomy becomes clearer to CG</td>
<td>Authorization of third-party contracts by CG, but tight control</td>
</tr>
<tr>
<td></td>
<td>Little concerns for broader longer-term goals</td>
<td>CG emphasizes short term financial goals</td>
<td>CG’s goal to develop a full in-house ADDS capability becomes clear to Alza</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Relationship to be more difficult and contentious than expected</td>
<td>Both see stable relationship as unlikely</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Goals become increasingly divergent between partners</td>
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<td></td>
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<td></td>
<td>CG takes over and fully integrate, or divest Alza and build in-house capabilities</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>AZ multiplies third-party R&amp;D contacts</td>
</tr>
</tbody>
</table>

CG: slow-down in skill learning
AZ: little to learn from CG, except perhaps manufacturing
CG: Little more to learn from Alza
Concerns in CG about Alza’s learning being shared with others
AZ does not share all its research
and Ciba Geigy) it is useful to provide a brief overview of its major components, before we launch into its more detailed discussion. The overall structure of the framework is illustrated in Figure 1. We first observed a set of initial alliance conditions that determine whether, and how, learning takes place between the partners. The initial conditions could be most clearly understood as comprising a definition of the task to be performed, a set of action routines borrowed from the organizational contexts of each partner, a design for the interface between the partners, and a series of expectations about the performance of the alliance (and the behavior of one’s partner) towards and within it.

These initial conditions were observed to facilitate or hamper the partner’s learning about the environment of their alliance, how to work together to accomplish the alliance task, their respective skills, and each other’s goals. Both how each initial condition is set, and the interdependencies they create between learning on various dimensions, influence learning.

As the partners engaged into the alliances, and the initial conditions allowed them to start to learn, both cognitively and behaviorally, from the joint or coordinated activities and from the interactions with each other, they also started to monitor the alliance for efficiency, and each other for equity and adaptability. Their learning fed into periodic reevaluations of the alliance according to these three assessment criteria, which, in turn, led partners to make adjustments to their relationship by moving away from its initial conditions. Successful alliances were seen to evolve through a sequence of learning–reevaluation–readjustment cycles over time, in which the impact of initial conditions quickly faded away. Unsuccessful alliances stumbled on the absence of learning, or on stunted learning (where the partners understood what was needed to succeed but did not know how to make it happen), or, still, on successful reevaluation leading to negative readjustments as partners concluded they would not work together successfully.

The learning cycles of successful alliances cumulated over time, as alliance participants went through a sequence of progressively improving on the initial conditions of the alliance, and of making increasingly irreversible commitments to the alliance. They were also willing to make irreversible commitments first, expecting the partner to reciprocate, but using the opportunity to build and test trust. Throughout these cycles partners’ expectations about alliance efficiency, equity between partners and adaptability of the partners were positively reevaluated by these commitments, justifying in the eyes of the partners further efforts to make their relationship successful. Learning cycles thus fed into sequences of growing cooperation between the partners.

Evolutionary cycles

From alliance inception to learning

The alliance between Ciba Geigy (CG) and Alza (AZ) started in mid-1977 when CG signed a research agreement with AZ and also took a majority equity position in the company. The agreement had been reached at the initiative of Dr. Alejandro Zaffaroni, AZ’s founder and CEO,
(who sought to secure sustained funding and market access for the advanced drug delivery systems (ADDS) he and his company pioneered) and of Dr. Gaudenz Staehlin, the head of CG’s pharmaceutical division. AZ was an entrepreneurial company based in Palo Alto (California); CG was a major pharmaceutical and chemical multinational headquarters in Basel (Switzerland). AZ’s expertise in ADDS R&D was to be combined with CG’s experience in drug development, production and marketing to develop new controlled-release oral pills (OROS) and transdermal patches (TTS) that would allow chemical entities to be released in regular and small amounts into the bloodstream of patients. AZ was to do the research and advanced development for all the new technologies and the development of some TTS applications (already under way as the agreement was reached), while CG would handle clinical development, registration, production and commercialization. ADDS had the potential to renew CG’s product portfolio at a time when CG’s conventional research for new chemical entities was failing to turn up promising substances.

Dr. Staehlin was concerned with the risk that too heavy-handed involvement by CG, a big and rather bureaucratic multinational corporation, into an alliance with AZ might stifle the smaller firm’s innovativeness. Hence, it was decided to limit coordination to CG’s majority representation on AZ’s board, to an initial ‘joint research conference’ (to set R&D priorities and get to know each other) followed by twice-yearly ‘joint research board’ meetings (to review progress and reassess priorities). In addition ‘project sponsors’ were appointed in Basel for transdermal patches (TTS) and in Summit, NJ (where CG’s U.S. subsidiary is based) for OROS pills. Project sponsors were in charge of day-to-day technical communications and coordination with AZ about their project areas. Their counterparts were the respective project leaders within AZ. These sponsors were well-regarded senior scientists and lab managers from CG, who received this responsibility in addition to their other duties.

The alliance was entered with great expectations. Both sides hoped to obtain within 2–3 years a first wave of OROS products and one or two major new products from the TTS technology. Beyond this short-term success, research was to be carried out on promising technologies with longer-term potential, such as implantable polymers and minipumps. Sixty percent of the joint R&D budget was devoted to short-term development projects, the balance to longer-term research.

Less than 2 years into the cooperation, serious difficulties surfaced. Although projects made good progress, it became clear that the OROS technologies would need substantially more application-specific development than expected, and that such development would need to involve ‘downstream’ functions, such as manufacturing and marketing. In the absence of joint AZ–CG teams it was difficult to perform the interactive application-specific development between the delivery system’s features and the chemical substance’s characteristics.

Put differently, the initial interface was limited to periodic research board meetings and to an assumption of ‘hand-over’ of new products, from AZ to CG, whereas the actual nature of the developmental task called for reciprocal and simultaneous interdependencies to be managed between the partners (Thompson, 1967). Further, the need to involve multiple functions within CG early in the development work challenged a tradition of sequential involvement of various functions in a well-structured, but slow, drug development process. The relative lack of interaction with AZ and its own bureaucratic structures and processes made it extremely difficult for CG to learn to play outside its usual procedures for new drug development, which were geared toward new chemically active ingredients, not new delivery methods.

Frustrated with what they saw as sluggishness on CG’s part, AZ’s scientists and managers started spending time in Basel, and trying to play, single handedly, a coordination role within CG. In this experience the AZ personnel, used to easy and rapid contacts at all levels in their organization, had trouble understanding the emphasis placed in CG on the correct approach to its management and scientific hierarchies. Yet, as AZ’s researchers found that following the ‘proper’ channels usually delayed decisions, they increasingly went straight to the managers most likely to give them an immediate (and favorable) answer. According to the head of development at AZ:

The way we operated was frightening to them. We were a threat, as any outsider is to a closed
environment, but also because we would walk around, shop in the Basel corridors, and bypass their hierarchy to work directly with the people who interested us.

Yet, since most of those whom they knew personally were either very senior managers or lab scientists working on the ADDS projects, AZ’s members were seen as bypassing primarily the middle layers of the CG hierarchy. This did not endear AZ to people most able to get things done within CG. Top managers were too far removed from day-to-day research, and the potential conflicts between their duties as board members of AZ and as CG managers and partners made them very cautious in their actions toward AZ. Individual CG scientists, and even team managers, had little latitude in resource allocation, and despite their potential enthusiasm gained few rewards from a close involvement with AZ.

In a more abstract perspective each of the two partner firms was using its own usual organizational ‘routines’ at the interface between them, often with poorly understood consequences such as conflicts, tensions, and people ‘opting out’ of the relationship. Combined with the greater than expected need for managing project task interdependencies, these deep discrepancies in organizational structures, processes and action routines slowed down the progress of OROS. This made OROS look like a less and less superior alternative to CG’s own in-house slow-release system development efforts. In Summit, in particular, rather than embrace OROS, CG’s technical personnel started to question its true potential. Project sponsors were weighting OROS’ merits in comparison to alternatives, in CG and from third parties.

The TTS projects moved faster, mainly because the need for task interdependency was not substantially higher than expected, given a ‘hand-over’ point from AZ to CG taking place later in the process, after AZ had completed most development on its own. Further, TTS found very active ‘champions’ in CG. There were several reasons for this championing.

First, TTS had been a secondary priority to OROS in CG’s commitment to AZ, and a few key scientists within CG (including the TTS project sponsors), who believed strongly in TTS’ future, were very keen to convince their own organization of its merits. Second, these champions were fortuitously able to step out quickly from and to transcend their organizationally specified roles to do what was ‘right’ for TTS. One champion was a very strong scientist who enjoyed a very respected position scientifically in CG, and socially in Basel; another was an outstanding scientist too, and a well-regarded manager close to retirement; a third was a young entrepreneurial scientist who shared AZ’s dreams about the future of ADDS.

For these various reasons, each was able to shift quickly from mere organizationally prescribed roles which would have slowed down the projects to interpersonally driven commitments (Ring and Van de Ven, 1994) which helped accelerate them.

The discovery of the mismatch between the task needs and the initial design of the (rather arms’ length) interface led to the creation of ‘liaison desks’ between CG and AZ, with two representatives from each firm stationed at the other, one for scientific matters, one for business issues. In other words, the partners understood that more interdependence was required, and that multiplying informal contacts, as AZ had started to do, had its costs, in particular in aggravating CG’s middle ranks. Liaison desks were seen as a structural solution to the difficulty. Yet, increased communication through these liaison desks did not suffice to improve the relationships.

The technology base of AZ, and the way AZ operated, were so different from CG’s as to make communication extremely difficult. AZ relied typically on small multidisciplinary multifunction teams working closely together in real time, tacitly sharing a similar context and a common experience on ADDS. CG typically relied on individual scientists or technicians, or small specialized groups intervening sequentially in a precisely structured, thoroughly documented process. Despite increased communication, the two companies were too far apart in their ways of doing things to understand each other and connect to each other effectively.

Expectations suffered. The initial goal of quick market introduction of new products faded into the future. CG’s lack of involvement with AZ, after an initial phase of relief, led AZ’s scientists to wonder how seriously CG was interested in ADDS, and to worry that, perhaps, CG saw their contribution as ‘granted’ in the context of a full acquisition of AZ by CG in the future. Conversely, AZ’s growing eagerness to secure third-
party research contracts (part of the initial agreement, but which had to be vetted by CG) was seen by CG as a testimony to AZ’s intent to break loose from the relationship. AZ presented these efforts as a logical response to CG’s perceived inability to move products to markets quickly, and its reluctance to keep funding AZ fully.

As we analyzed the unfolding of the initial stages of the relationship as summarized above, we saw the interplay between four factors driving its evolution. First, the two partners entered their relationship with a definition of the tasks to be performed, which did not do justice to their true complexity, at least for OROS, in particular to the amount of application-specific interdependent work to be undertaken to succeed.

Second, each partner projected onto the other, through the interface in their alliance, a set of organizational action routines borrowed from its own organizational context, that became baffling, disconcerting and ultimately aggravating to members of the partner firm. In particular, while the ‘top’ and the ‘bottom’ of the CG research organization were actively working with AZ, middle management ranks were not involved. Worse, they saw both top management attention, and what they perceived as lavish funding given to AZ (not knowing the magnitude of the tax benefits brought to CG by AZ’s losses), with jealousy as they were caught in a very hierarchical organization and a budget freeze that made it hard to get resources.

Third, the interface between the two partners was exceedingly ‘light’ and did not allow, at least initially, for even the recognition and the appreciation of differences between the way the two firms operated. It is only when a handful of key sponsors at CG took the risk to step out of an organizationally defined role and personally reach out for AZ, around the TTS project, that the interface became more substantive and led to shared understanding. Formal attempts at strengthening the interface, though, only made each partner more aware of the gulf that separated it from the other partner firm.

These three factors—the definition of the task to be jointly performed, the partners’ respective organizational routines, and the interface between them—form a set of initial conditions that we saw as key determinants of the evolution of the partnership.

A fourth factor plays a rather obvious role: expectations. Each partner entered the alliance with a set of explicit, and shared expectations (to develop and introduce new products), also with privately harbored expectations (for CG that it would acquire AZ later on if ADDS turned out to be a winner, for AZ that it would ‘borrow’ CG’s money and reputation for a while and then regain its freedom) and with a tentative understanding of the partner’s motives. Some of these expectations stemmed from the strategic context they entered the alliance from. Each partner also had expectations about norms of behavior on the partner’s part, and used the early cooperation process as a way to gather clues to validate, challenge or recast the initial expectations.

In the CG–AZ alliance, these four initial conditions did not foster cooperation. The initial separation of tasks between the two companies delayed the realization that OROS called for more task interdependence. Moving to greater interdependence, though, did not provide a solution (for OROS) except where people were willing to step out of their organizationally prescribed roles (for TTS). Developing a very integrated approach was unlikely to foster learning anyway, as the different knowledge bases of the two companies were reflected in very discrepant organizational routines. Tight task interdependencies make learning difficult (Levinthal and March, 1993) because local adaptation is impossible without ripple effects through the whole set of tasks. Interorganizational interdependencies would have made matters even worse because ripple effects would have propagated between partners.

These differences had an additional adverse consequence: by interacting with CG in the same way as they interacted among themselves, the AZ employees alienated a very large proportion of CG’s middle management, and some technical personnel. By applying its usual—slow, deliberate, bureaucratic—procedures in interacting with AZ, CG’s heightened AZ’s reluctance to fully commit to a relationship with CG.

The initial interface between the two companies was too narrow, too distant, and too discontinuous, between people already saddled with many other tasks, to foster learning and mutual appreciation between the partners.

The initial expectations were not met on at least three dimensions. First, the performance of the alliance (in particular the delays in bringing
new products to markets) was disappointing. Second, both partners found the other ‘harder to work with’ than expected. Third, the expectations of a harmonious partnership did not survive the growing suspicions about the divergent longer-term motives of each partner.

The ambiguity surrounding true initial expectations also made cooperation difficult. To AZ, CG was a client and an investor (potentially among others). To CG, AZ was a close partner, likely to turn into an acquisition. The fact that the initial agreement left room for such widely different perceptions and broad frames (although perhaps in itself a fact that facilitated the inception of the collaboration) led to growing suspicions and tensions as each partner was searching for clues in the behavior of the other. What they saw tended to be read increasingly in the light of doubts and suspicions about the other party’s true intents.

Yet, as they nonetheless learned something about the task, about each other, and about their respective intents, the partners came to doubt the future of the relationship. The more they discovered the demands of the task, the more they doubted their ability to work sufficiently closely together to perform it successfully. The more they understood each other’s motives, the more qualms they had about maintaining their compatibility. The more they understood each other’s cultures, the more they saw how difficult it would be to bridge the gap separating them. Put differently, cognitive understanding not only led to lower expectations of efficiency, equity and adaptability, it made the behavioral learning agenda look taller and taller. As the partners discovered how much effective cooperation would require changes of behavior on their part, they lost confidence in their ability to make such changes.

In summary, initial ‘separateness’ of tasks between the partners led to a slow recognition of the task performance needs, in particular the need for a different type of interdependency than CG knew how to handle. There was little joint sense-making and little learning about how to interact successfully. Discrepant organizational routines also contributed to the slow and ineffective response to the need for coordination between the partners. The two partners did not rapidly learn how to work together. Quite to the contrary, they found working together increasingly frustrating. The weak interface also added to the difficulties. Tight cost control at CG led CG to underinvest in the relationship, as did top management’s concerns for maintaining AZ’s autonomy. Suspicions about CG’s motives led AZ not to seek the most effective interface, lest it diluted and transferred AZ’s skills to CG. As a result, neither partner understood enough of the other’s skills to be able to commingle skills effectively. Initial performance expectations were not met (results were slow in coming, and each partner gave the other an impression of lack of flexibility and commitment), and suspicions about ulterior motives were not dispelled.

In the OROS projects, the initial conditions (task definition, partners’ organizational routines, interface structure, and expectations about performance, behavior and motives) did not allow learning to take place. Rather than blaming the failure on the cooperation process, the CG scientists and managers (perhaps in an underestimated manifestation of a ‘not-invented-here’ syndrome) quickly reduced their expectations and their commitment toward OROS.

In the TTS projects, several factors led to a more favorable evolution. First, TTS was seen as an opportunity by the CG champions. Paradoxically the fact that OROS was CG’s main priority allowed the scientists and technical personnel involved in TTS to learn to work together away from the spotlights, and with less time pressure. Second, their more secure position within CG allowed the TTS ‘sponsors’ (and champions) to step out of organizationally defined roles, and to do what was needed for TTS, rather than what those roles prescribed. The development of interpersonal relationships also allowed them to build an informal ongoing interface. Finally, a common commitment to TTS’ success made broader concerns about ulterior motives recede.

Comparative analysis. The contrast between TTS and OROS shows how the different personal commitments and behaviors of the involved scientists and managers differed unexpectedly between the two projects largely as a function of different organizational contexts between the two projects within CG. By extending our comparison to the other two alliances we researched, we can extend our analysis to other, contextual factors, that affect how the initial conditions allow or hamper learning. In particular, another of the alliances we researched, that between GE and SNECMA,
provides an interesting contrast to that between CG and AZ.

In the GE–SNECMA alliance, the initial conditions were much more conducive to learning. First, the experience and skill base of the two partners were sufficiently overlapping for them to codevelop an engine without much ongoing task interdependence.1 Once the engine was in test, and in service, more interdependent work became necessary to optimize its performance, but by then the partners had learned to trust each other, and to work together. In other words, the growing interdependence demands of the task matched the growing ability of the partners to work interdependently. Second, the partners enjoyed from the start a much clearer and common strategic context than in the CG–AZ alliance: both had identified the ‘mid-range’ engine size as a promising market segment before they entered the alliance, and their expectations did not create conflict. Both had a common enemy: Pratt & Whitney. Both saw the alliance as a way to ‘challenge’ Pratt & Whitney’s leadership of the industry. Each partner was strongly shouldered by its respective government making deeply unbalanced outcomes, such as a takeover, unthinkable. Further, they widened their cooperation over time to include the complete range of their civilian products, and competed only indirectly on the military side (their engines were very seldom directly interchangeable on the same military airframe). Third, managers at both GE and SNECMA were searching for how best to serve the civilian market. Rather than project blindly onto the alliance procedures from the military jet engine business, both sought to develop, jointly, the most adequate processes for serving airlines. As a result, they developed a similar organizational context, ‘mirroring’ that of the partner and a commonly chosen set of new organizational processes. This facilitated everyone’s involvement in both partner companies. Fourth, a small but intensely ‘connected’ program management joint venture was created, as a focal point of the interface. Located in the U.S.A., on GE’s premises, but headed by a French executive, and staffed with managers and specialized personnel delegated from both parents, it provided a relatively strong interface. Further, some managers had dual positions: within the JV and within their own parent organization.

Comparing the CG–AZ and GE–SNECMA relationships shows how the set of initial conditions impacts the ability of managers to learn about various aspects that are critical to the success of the alliance:

—The environment of the partnerships, which encompasses both the external environment such as markets, competitors, governments, and an internal environment (the strategic context of the partnership within each partner organization). Obviously, both the external and the internal environments can be fully discovered only through actions that stipulate them, and are often made explicit only ex post (Burgelman, 1994).

As partners have more or less similar perceptions of the external environment, and more or less compatible evolutions of their strategy contexts, learning about the environment may lead to convergence or not between the partners. The mere fact of joint learning—leading to joint sense-making and shared premises—though, is likely to foster convergence and cooperation.

—The task of the partnership and how to perform it successfully, in particular when the task is initially ill defined, when partners bring very different skills, when the alliance suffers from high information asymmetry between the partners, and when the task interdependence between the partners needs to be high.

—The process of cooperation, as partners discover each other in the collaboration, they recognize how their differences in structure, processes, action routines, and the like may need to be overcome, or even constructively combined, to make cooperation more efficient. This may lead the partners to improve their process of cooperation over time.

—The skills of the partners. Skill learning allows the partners to cooperate more closely in performing the alliance tasks as their respective skill bases converge and overlap. Very low skill learning raises doubts about the effectiveness of the alliance, and suspicions about the partner’s motives (we saw both in the CG–AZ relationship). Very high skill learning raises concerns that a partner may be about to ‘outskill’ and ‘outlearn’ the other (Hamel, 1990, 1991). Sustainably differentiated, but partly overlapping skill bases may contribute the most to alliance success.
—The goals and motives. The behavior of each partner in the collaboration process usually offers clues to the other about its motives and hidden agendas beyond, or beside, the explicitly shared goals of the collaboration. Further, and more interestingly, the collaboration process itself may lead partners to clarify, revise, or refocus their own goals. New unseen benefits or risks to the corporation may become visible, or new outcomes may now be expected, given the partner’s interpretation of the evolution of the partnership.

We can therefore conceptualize the initial phase of collaboration in a strategic alliance as the interaction between four initial conditions (task definition, partners’ organizational routines, inter-partner interface design, and partners’ expectations) and five learning processes, or learning dimensions: environment, task, process, skills and goals.

As presented in summary form in Figure 2, learning on each of these dimensions is important to reassess the appropriateness of the initial conditions. In other words, learning leads to improvements in the task definition (e.g., a more realistic understanding of how to perform the joint task successfully). Learning also leads to an assessment of how suited the partners’ routines are to the task, and of how compatible they are across partners. Learning also educates the partners about the quality of the initial interface structure, and about how to make it more effective. Learning, finally, allows partners to revisit and revise their expectations and to gain a deeper understanding of those of the other partner(s). This learning, in turn, allows the partners to modify the initial conditions of their alliance to make it increasingly effective over time. This translates cognitive learning into organizational learning.

The initial conditions drive, or fail to drive, the learning processes. As we saw in the OROS project the initial conditions proved highly inertial: rather than drive learning processes, they locked the partners quickly into a repetitive pattern of unsuccessful interactions. As the partners understood more of their relationship, they increasingly saw how inadequate these patterns were, but did not know how to break them. In the TTS project, although some of the initial conditions were similar, it was easier to develop products without as strong interdependencies as with OROS, with more committed champions who stepped out of organizationally prescribed roles when needed, and without the pressure of high top management expectations.

The AT&T-Olivetti relationship, which suffered from many of the same issues as the alliance between CG and AZ, allows us to consider more clearly a source of difficulty which also surfaced between AZ and CG: a difference in issue identification and decision-making speed between the partners. Olivetti (OL) would come with very quick, incremental suggestions to ‘improve’ the relationship, based on issues OL’s management had identified, worked on and ‘resolved’ quickly. AT&T, a bigger, slower, more bureaucratic organization, would not be able to follow OL’s speed in neither issue identification nor decision making. As a result, very seldom were the two partners able to jointly consider the same issue in the same time frame.

A first step in building an alliance evolution framework, and in answering our initial research question, is therefore to recognize that initial conditions may determine alliance outcomes when these conditions are highly inertial, i.e., when they lock partners into a repeated mode of interaction, with little learning of each interaction, with typically greater frustration on the part of the partners, both about their interactions, and the lack of progress of their alliances. Conversely, initial conditions that foster learning, on the part of the partners, about the environment of their relationship, the task at hand, each other and how to work together, their respective skills, and their motives, trigger an evolutionary path for the alliance: as learning takes place, the partners take that learning on board, and move away from the initial conditions to establish new conditions in light of the lessons drawn from that learning. Based on our in-depth anlaysis of the CG–AZ relationship, and in particular on the contrast between the OROS and TTS projects in that relationship, as well as on the comparison of all six projects, we summarize in Table 3 a set of preliminary observations about inertial and adaptive impacts of initial conditions.

From cognitive learning to revaluation

We observed, though, that the linkage between learning and ‘corrective action’ on initial conditions was not automatic: not only was cognitive learning easier than behavioral learning, some-
Evolution of Cooperation in Strategic Alliances

LEARNING DIMENSIONS

<table>
<thead>
<tr>
<th>Environment</th>
<th>Task</th>
<th>Process</th>
<th>Skill</th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task external suitability (vis-a-vis markets, competitors, etc.) &amp; partner context</td>
<td>More clear task definition and performance conditions</td>
<td>Suitability of cooperation process to task demands</td>
<td>Need for some skill overlap and task achievement</td>
<td>Matching alliance activities with own goals and emerging assumptions about partners’ goals</td>
</tr>
</tbody>
</table>

LEARNING DIMENSIONS

<table>
<thead>
<tr>
<th>INITIAL CONDITIONS</th>
<th>Task Definition</th>
<th>Partners’ Routines</th>
<th>Interface Design</th>
<th>Expectations</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Task external suitability (vis-a-vis markets, competitors, etc.) &amp; partner context</td>
<td>Appropriateness of routines to task</td>
<td>Ability to develop shared premises</td>
<td>Strategic context for partners, valuation logics clarified, revealed</td>
</tr>
<tr>
<td></td>
<td>More clear task definition and performance conditions</td>
<td>Suitability to task and interface</td>
<td>Ability to “integrate” the joint task</td>
<td>Realism given the task definition and demands</td>
</tr>
<tr>
<td></td>
<td>Suitability of cooperation process to task demands</td>
<td>Receptivity ability to internalize skills</td>
<td>Suitability of the initial interface design</td>
<td>Continued co-specialization vs. substitution</td>
</tr>
<tr>
<td></td>
<td>Need for some skill overlap and task achievement</td>
<td>Effectiveness to achieve goals</td>
<td>Ability to co-mingle without diluting skills</td>
<td>Mutual discovery/clarification of goals</td>
</tr>
<tr>
<td></td>
<td>Matching alliance activities with own goals and emerging assumptions about partners’ goals</td>
<td></td>
<td></td>
<td>Revise Refocus own goals</td>
</tr>
</tbody>
</table>

Figure 2. How learning on various dimensions contributes to raise partnership conditions

times leading to discouragement, more generally, corrective action was conditioned by the willingness of the partners to keep committing to the relationship. In other words, learning was not always reinforcing the relationship.

As they started cooperating, partners watched each other through the interface, with a view to assess and adjust their expectations. We observed partners making three types of assessments: (1) an assessment of the likelihood of the alliance to create value, i.e., of its success, (2) an assessment of the partner’s behavior in terms of trustworthiness and forthrightness, leading to growing trust or growing suspicions, and (3) an assessment of the partner’s adjustment capabilities. In sum, the ongoing assessment focuses on efficiency, equity and adaptability.

In the CG–AZ relationship, negative assessment along all three dimensions surfaced. As time went by, AZ’s managers saw less and less value to the relationship. They perceived CG to be slow to market, even in areas such as TTS where good progress was made, but where being first to market with an FDA-approved product was key. TTS faced unexpected manufacturing problems, (which AZ attributed to poor interfunctional coordination within CG, and to CG’s (suspicious) desire to ‘reinvent the wheel’), and OROS faced great difficulties. According to AZ’s head of the OROS project:

My biggest and only major disappointment is they did not develop the products we transferred to them. Maybe it was not malicious, they are extremely slow in moving their own products, and rife with internal conflicts.

In 1980–81, ADDS became increasingly well accepted in the pharmaceutical industry. This had two consequences on the relationship. First, it provided an added sense of urgency to AZ, who saw itself losing its early technological lead. Second, it made alternatives to an exclusive reliance on CG increasingly viable. Yet these alternatives could not be pursued. According to a senior manager at AZ:

The industry saw us increasingly as a subsidiary of CG, CG was an obvious deterrent to satisfying demand for ADDS from other drug companies.

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Put differently, AZ’s assessment of the potential for value creation of their relationship with CG, compared to alternatives, was dwindling. AZ’s perceptions of CG’s adaptability also
Table 3. Inertial and evolutionary impact of initial conditions

<table>
<thead>
<tr>
<th>Inertial</th>
<th>Evolutionary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Task definition</strong></td>
<td>Modular task definition, with clearly defined boundaries and task interfaces</td>
</tr>
<tr>
<td>Dense and tight systemic interdependencies in task structure</td>
<td>Complementary and differentiated, but partly overlapping skill bases</td>
</tr>
<tr>
<td>Deeply differentiated skill bases, no overlaps between partners</td>
<td>Internal autonomous ‘championing’ within each partner organization</td>
</tr>
<tr>
<td>Urgency, criticality and visibility of alliance results to top management</td>
<td></td>
</tr>
<tr>
<td><strong>Organizational routines</strong></td>
<td>Compatible routines between partners, or exemption from existing routines</td>
</tr>
<tr>
<td>Deeply differentiated routines (coevolved with skill base)</td>
<td>Organizational integration, quality of internal communication, common ground</td>
</tr>
<tr>
<td>Organizational fragmentation (between levels, functions, locations)</td>
<td>Similar pace and rhythm of issue resolution and decision making</td>
</tr>
<tr>
<td>Clock-speed differences between partners</td>
<td>Desire and ability to engage in joint search for new more effective routines</td>
</tr>
<tr>
<td>Strongly embedded routines, defensive activation</td>
<td></td>
</tr>
<tr>
<td><strong>Interface</strong></td>
<td>Readiness to make breadth and nature of the interface evolve over time as a function of mutual understanding and trust</td>
</tr>
<tr>
<td>Distant, narrow and formal or unstructured and open, designed at inception</td>
<td>Expected continuity of key interface and partnership managers</td>
</tr>
<tr>
<td>Discontinuous managerial involvement, expected changes in key personnel (e.g., as part of career development policies in partner firms)</td>
<td></td>
</tr>
<tr>
<td><strong>Expectations</strong></td>
<td>Realistic and flexible expectations</td>
</tr>
<tr>
<td>Optimistic and ambitious expectations set early</td>
<td>Similar or compatible frames of reference between partners</td>
</tr>
<tr>
<td>Conflicting frames of reference between partners</td>
<td>Concern for value creation and value appropriation</td>
</tr>
<tr>
<td>Concern for value appropriation</td>
<td>Limited ambiguity and information asymmetry</td>
</tr>
<tr>
<td>High ambiguity and information asymmetry</td>
<td></td>
</tr>
</tbody>
</table>

According to the head of the OROS project:

Interfunctional relationships were poor, and they had problems between Summit and Basel. Top management is oblivious to these things, but at lower levels they slow things tremendously. Alza was brought in top down, and we suffered from it; in CG, people do not talk up and down, and it is not clear whether organizational problems were really known to top management.

As these problems became better understood by AZ’s personnel, AZ’s faith in its ability to solve or at least to by-pass them off-line decreased.

Suspicions also grew within AZ about CG’s ultimate motives. According to AZ’s key personnel:

We knew they were doing some work on TTS that they would not share with us . . ., we always felt that CG had information they should have fed back to us, but did not.

CG lacked the confidence that we could turn ourselves around. They started making openings to our people. This was a sore point in what had been up to then a gentlemanly relationship . . . Problems were at middle levels within CG, with the attitude ‘who cares, we own them.’ According to the agreement, all ADDS-related research was shared, everything had to come back to us, nothing did!

AZ’s perceptions of the trustworthiness and forthrightness of CG deteriorated over time as AZ’s management saw the company being run down by CG as CG built its own, in-house, ADDS development capabilities.

On all three dimensions of efficiency, adaptability, and equity, AZ’s assessment of the relationship with CG declined over time.

This deterioration in AZ’s expectations was
paralleled at CG. AZ’s denials notwithstanding, the prevalent view of AZ’s motives became increasingly critical. Typical of the 1981 comments on the situation, from CG’s side were:

There never was a sense of long-term commitment from AZ toward CG, they were smart enough to know CG was needed for a while, but wished to rid themselves of the yoke as soon as possible.

Further, many in CG started to doubt the integrity and the commitment of AZ’s top management. Dr. Zaffaroni’s growing involvement with new ventures and spin-offs fueled a suspicion that he was preparing his own exit from AZ.

As we mentioned earlier, CG’s assessment of OROS deteriorated rapidly, the conclusion widely reached within CG being that the technology was not worth the effort, rather than the effort was not properly managed. In sum, rather than try to improve the interface to fit a better understanding of the task complexity, the implicitly decided action was to decommit from OROS, and to build on TTS.

Thirdly, CG’s personnel were increasingly aggravated with AZ’s style and behavior.

Alza never let confidence develop, they made constant criticisms and attacks on people who were their best friends. Close personal collaboration was very rare, and most CG people ended up feeling betrayed.

We observe here the absence of adaptive learning. The repetition of a pattern of interaction over time breeds growing suspicions and frustrations in the relationship, and leads to a decreased assessment of the potential value of the relationship, of the capacity of the partners to adapt to the needs of the task, and to each other, and of their judgement of each other’s trustworthiness, both in ethical standards, and in ultimate motives.

Comparative analysis. Here again, the contrast with GE–SNECMA is enlightening. In this alliance all three dimensions of revaluation evolved positively. First, the expectation of efficiency was more robust, i.e., it was clear that the two partners needed to work together to develop a mid-range engine and secure the market for it. Although the market developed later and more slowly in the wake of the oil crisis than originally anticipated, the clarity of the expectations about the efficiency led to a strong institutional commitment on the part of each partner firm. This strong commitment and the fact that both were seeking their way into a new business—civilian engines—let people interpret that commitment to develop their own joint rules, procedures and heuristics, rather than project strongly established ones onto the interface between partners. Institutional commitment was transferred into effective interpersonal trust through the joint search for ‘the best way for us.’ This growing interpersonal trust resulting from joint ‘sense-making’ led to a greater willingness to jointly seek ways to improve the efficiency of the alliance. As the alliance evolved, the cooperation between the two companies became more and more far reaching on a broader front. Rather than be strictly confined to what was needed for the joint tasks, the exchange between the companies widened to some underlying core technologies, such as advanced composite materials for turbine blades, and to manufacturing process and management competencies. Starting with the CF6 engine back in the 1960s, the two companies had engaged into recurrent contracting processes that evolved into relational contracting (Ring and Van de Ven, 1992).

From revaluation to readjustment

Once learning and revaluation had taken place, the third phase in the learning cycle leading to readjustment was a relatively straightforward one, as compared to the previous two: partners knew what they wanted to do and had ideas about how to do it. In the GE–SNECMA relationship, a self-reinforcing cycle of heightened efficiency expectations, strengthened institutional commitments, deeper interpersonal trust, joint sense-making and learning, and greater flexibility and adaptability took hold. A balance was also sought between keeping the relationship dependent on a few key individuals over the long term and widening the number of people involved in the relationship, but at the cost of some continuity. Ultimately the management of the joint venture changed rather frequently, but a significant cadre of senior managers experienced in and devoted to the alliance was thus built within each partner firm. The partners also adjusted their internal organizations to make them more compatible, to the point that they came, over several years, to
mirror each other. All this, obviously, made the sustained commitment to the alliance, on the part of both partner firms, much more secure and reliable over the longer term. The self-reinforcing evolutionary dynamics led to a deeper and wider alliance over time, which addressed changes in the competitive and market environments successfully.

Conversely the CG–AZ alliance was terminated in 1982, after less than 5 years. By 1980–81, CG’s management had concluded they would get first-generation TTS products but should not hope for much more. Hence, in their view, investing in readjusting the alliance conditions was not worth it, neither in the design nor in the process of collaboration. CG decided to disengage from the relationship. Although initially taken aback by this decision, AZ quite successfully developed its contract research activities for a wider and wider range of pharmaceutical companies, and CG got several very successful TTS products. From a business standpoint the alliance can be characterized as successful, although significant new product development opportunities were missed and CG’s broader learning and transformation goals were not met.

In the six projects we researched, this third phase in the learning cycle was a very direct result of the learning that had taken place in the previous stages.

Summary: Successful and unsuccessful alliances

Initial conditions (set in terms of task definition, partners’ organizational routines, interface structure and partners’ expectations) facilitate or hamper partner learning along five dimensions: environment, task, process, skills and goals. Learning, in turn, allows the partners to reevaluate their partnership on the basis of perceived efficiency, equity, and adaptability. Reevaluation then leads to readjustment to initial conditions and, hopefully, to a new cycle of learning and reevaluation. Partners in more successful alliances engage in such a series of iterative and interactive learning cycles over time, typically characterized by greater and greater trust and adaptive flexibility, as well as the willingness to make larger and larger, as well as increasingly specific and irreversible, commitments.

In contrast to these successful learning cycles, alliances can fail in several ways. First, the configuration of initial conditions may block, or at least delay, learning, breeding growing frustrations and leading to unmet expectations. Table 3 summarizes our observations on conditions blocking or fostering learning, leading to alliance evolution or inertia. Second, initial conditions may allow cognitive learning (understanding how cooperation should take place), but also make alliance participants more aware of the difficulties of behavioral learning (making the alliance work). Initial conditions that allow separate learning by the partners but do not foster joint learning, or even the sharing of resulting insights between the partners, are likely to lead to this kind of failure. Such discrepancies between cognitive and behavioral learning lead to reevaluation which lowers expectations and typically heightens suspicions between partners (for example: ‘Is the partner really unable to change its behavior to cooperate more effectively or, rather, unwilling? If unwilling, why? Disinterest or hidden agendas?’) Figure 3 summarizes the contrast we observed between alliances where both cognitive and behavioral learning took place and those where only cognitive learning proceeded.

A third way alliances can fail is simply successful learning followed by negative reevaluation. The environment may change on the alliance in a way that makes it genuinely less economically attractive to at least one of the partners. As the dollar fell, following the Plaza Agreements of 1985, cooperating with Olivetti became less attractive to AT&T. As ADDS gained acceptance in the pharmaceutical industry, AZ’s quasi-exclusive agreements with CG (in practice if not in the letter of the agreement) became less attractive to AZ than a web of partnerships with different drug companies. Process and goal learning may also result in one partner becoming increasingly concerned with the evolution of the partnership. As the cooperation difficulties grew, both AZ and Olivetti became increasingly concerned with the possibility that their partner might come to see an acquisition as the solution. Further, the perceived lack of adaptability of CG and AT&T, respectively, did not bode well for their future role and autonomy once acquired. Once irreversible commitments had been made, to cospecialized tasks, technologies and products, alter-
Evolution of Cooperation in Strategic Alliances

Failed projects

Initial Conditions
Behavioral non-learning
(Task and process learning)
Non-adjustment inertia
Lowered expectations
Understanding of success requirements
Search for clues about hidden agendas
Cognitive learning
Lower Commitments
Failure

Successful projects

Initial Conditions
Behavioral learning
Adjustment to success requirement
Heightened expectations
Understanding of success requirements
Search for clues about hidden agendas
Cognitive learning
Higher Commitment
Success

Figure 3. Summary model of alliance evolution: Impact of cognitive and behavioral learning

natives to such an acquisition might not be available. Hence, AZ and Olivetti quickly became reluctant to make irreversible commitments to their alliances. But in so doing, they also quickly undermined some of the very potential for making the alliance efficient. In sum, in these two situations, the three criteria of reevaluation interplayed in a self-defeating way: actions taken to alleviate concerns on one criterion of reevaluation resulted in worsened performance on other criteria and to ultimately negative overall evaluation.

DISCUSSION

We started with a specific grounded theory question: what process descriptor variables, if any, mediate the links between the initial conditions and the outcomes of strategic alliances. We also started with a broad inquiry: to what extent are organizational processes inertial or adaptive, and why? In this section, still drawing on our research sites, but taking some distance from their specific circumstances, we revisit these questions.

The importance of initial conditions

Initial conditions play a key role in fostering or blocking learning, and in at least some alliances in allowing cognitive learning (what the managers understand of how the relationship should be handled) but in stifling behavioral learning (what managers can do to better manage the relationship). We saw the initial task definition fail to recognize the need for CG and AZ to ‘meet’ on OROS development, and the arm’s length interface between them provides little opportunity to do so. Yet, too tight a set of interdependencies both between subtasks and between learning processes, or interdependencies between deeply different organizations, may lead to negative learning and mutual rejection as we saw also in the CG–AZ alliance. Too close and all encompassing an interface may also block learning. The AT&T–Olivetti alliance in minicomputers faltered at least partly around an early and sudden, and in retrospect, premature, attempt to bring the engineering teams from both partners to jointly define a new product plan. While they went through the motions, they also felt threat-
ened by the need to make early commitments to a common new product line, before enough learning had taken place on any dimension. Shifting from next to no learning to tightly interdependent learning on multiple dimensions and to fast irreversible commitments proved impossible.

One tentative proposition, of a normative nature, is that the task definition and the interface design should be seen as generative designs, providing an opportunity to learn. For example, in another of their joint efforts, in private telephone switches, AT&T and Olivetti started with joint market research, competitors benchmarking, and the like. In other words, they engaged in joint sense-making, joint environment learning, and developed share premises before they undertook to consider the suitability of one product or another for the European markets and before the actual collaborative task was defined.

Perhaps more important, and certainly harder to adjust, than partnership-specific conditions—such as task definition and interface design—were the partners’ action routines they borrowed from their organizational and the strategic contexts that presided over the inception of the alliance. The importance of the organizational context needs little further elaboration, given how strongly organizational context discrepancies feature in the difficulties faced by CG–AZ, except for two notable points. First, organizational context tend to coevolve with the tasks they help perform, i.e., with the features of the industry, technologies and markets relevant to a firm. Insofar as alliances bring together firms with different technologies, markets and experiences, their organizational contexts are likely to reflect these differences, and make collaboration more difficult. Second, the difficulty of moving from cognitive, largely individual learning to behavioral, often collective learning—at CG and AT&T, in particular—seems to derive largely from the inability of these firms to reform their organizational context, or to make room for expectations to (or exemptions from) the dominant context. Working with AZ for CG, or with Olivetti for AT&T, challenged the strongly ingrained stable cultures inherited from decades of continuity.

Furthermore, in these companies, cooperation revealed poor vertical and lateral communications, and showed the disjointed learning taking place in various parts of the organization. Interestingly, neither the larger partners, such as AT&T and Ciba Geigy, nor the smaller ones such as Olivetti and Alza, seemed to learn easily, but for opposite reasons. While the larger partners were too disjointed and fragmented to learn effectively, the smaller ones were too tightly knit to allow localized learning and experimentation (Levinthal and March, 1993). In contrast to these two alliances, again, GE and SNECMA seem to have shared both a stronger need and a greater capability to learn, and were able to learn effectively together, and from one another.

The role of the strategic context may be further developed. We observed three different difficulties. First, was an overly deterministic strategic context. As the CEO of Alza commented:

CG became mesmerized by OROS, they wanted it to succeed according to their plans.

The strategic context can be overly deterministic both in substance, e.g., trying to specify prematurely exactly how the alliance ought to succeed and where it fits, precisely, in the strategy of the partner, and in frame, e.g., a minority equity position raising the fear, or providing the comfortable expectation of a full acquisition. In contrast to the determinism of CG, both GE’s and SNECMA’s strategic context left room for surprises. Indeed, the 1973 oil crisis ‘disturbed’ the airline market deeply, the development of the mid-size new airliners for which the engine was designed was postponed, and after several years of delays the engine succeeded first in the reequipping of older aircraft types, such as the DC 8 and the military versions of the B 707, a market segment for which it had not been intended. If the strategic context of their alliance had been defined too deterministically, the opportunity would probably have been missed and the program canceled.

Second, the strategic context of a particular part of the alliance may become the dominant context even when it is not appropriate to other parts of the relationship. In the AT&T–Olivetti alliance the PC trade from Olivetti to AT&T colored the whole relationship: contractual supplier–customer OEM relationships came to prevail. This contractual, opportunistic and often adversarial context (in particular after the fall of the dollar made supplying PCs from Italy less and less attractive) came to impact the overall relationship, in ways that were detrimental to cooperation in other product lines.
Thirdly, an underdefined, excessively emergent, strategic context can also undermine cooperation. As the managers of Olivetti came to recognize that AT&T was still seeking its way into the computer industry, they came to doubt the strength and continuity of AT&T’s commitments to the alliance and to minicomputers. A poorly structured or politicized organizational context may also make the alliance a stake in a wider game played within one of the partners and undermine the credibility of the strategic context. AZ’s managers, for example, saw their alliance with CG buffeted by the consequences of the conflict between Basel and Summit on the management of R&D. Similarly, Olivetti’s executives felt hostage to a broader debate about whether AT&T should continue to expand in computers despite mounting losses.

From that standpoint, the management of strategic alliances may be a good test of a firm’s capability to be simultaneously purposive and adaptive: i.e., to have a relative clear sense of strategic priorities, and at the same time, to maintain the ability to learn from the alliance.

Behavioral and cognitive learning

We observed two patterns of interaction between behavioral and cognitive learning. When initial conditions allowed cognitive learning but blocked behavioral learning and adaptation, expectations of efficiency quickly suffered as managers became increasingly aware of the difficulties facing their alliance, and of the little progress they made in surmounting them, and initial conditions came to dominate alliance outcomes. When the initial conditions allowed both cognitive and behaviorial learning to take place, often in interactive sequences of actions and cognition (Burgelman, 1988) bringing trust and self-confidence, and the capability to improve on initial conditions, they progressively faded away as the relationship evolved to reflect the learning accomplished. Initial conditions, therefore, should be seen not in static efficiency terms (‘do they allow the alliance to be successful?’), but in dynamic learning terms (do they allow the partners to learn about how to improve their alliance, and do they provide the flexibility for improvement?’). Early steps in the collaboration process may, perhaps, be most usefully conceived as generative and confidence-building steps, leading to constructive cycles of trust development and of adaptation of the initial conditions.

Small events, big consequences

As became clear as we retraced the early steps taken by partners in new alliances, small early events had significant consequences. As the partners enter the cooperation, they start observing each other through the interface they have created. They watch each other for clues about reevaluation. In other words, while formal, or explicit even if unilateral, reevaluation is a periodic rather than continuous exercise, the information gathering that feeds that exercise is continuous and starts early. Partners watch each other for unexplained divergence between what they see as the task requirements and the behavior of the partners vis-à-vis those requirements, which might denote lack of competence, lack of flexibility, or ultimate ‘unspeakable’ motives beyond the efficiency of the alliance. In other words, they read in the behavior of the partner clues about the partner’s competencies, capability to adjust, and trustworthiness.

Short of being able to cooperate only repeatedly with the same partners (Gulati, 1995), or at least with partners whose prior reputation is above suspicion (Larson, 1992), and consistent with the observations from game theoretic simulations (e.g., Axelrod, 1984), early ‘small’ events in an alliance have a disproportionate importance in establishing, or not, a self-reinforcing cycle of heightened efficiency expectations, greater institutional and personal trust and commitment, joint sense-making and learning, and greater flexibility and adaptability.

Put differently, what is accomplished early in building quality into a cooperation process may be more important than the outputs the process actually achieves early. Managers in projects submitted to a great sense of urgency by top management were observed to take opposite priorities: focus on the task, to the detriment of the process—both in the AT&T–Olivetti and in the CG–AZ alliances. Early cooperation might more usefully focus on achieving a very high level of cooperativeness on relatively less critical tasks, and smaller stakes than was undertaken in these two alliances. Interestingly enough, the first collaborative project between GE and SNECMA offered such an opportunity; SNECMA was a
risk-sharing subcontractor and 'proved' itself in that project. Each partner was able to discover, and to learn to trust the other in a situation where stakes were moderate on both sides. Conversely, the stress inherent in high-stake, high-urgency, high-risk projects seems to lead members of the partner organizations to want to 'play it safe' (by the book), and thus to stifle learning—in particular behavioral learning. It is ironical to observe, albeit very tentatively given our extremely small sample, that projects which were not key to the corporate agenda, such as TTS in CG–AZ or PABX in the AT&T–Olivetti alliance, started much more constructively than the core projects of these alliances, and succeeded better. Managers under more pressure had less time and space to learn, less patience to engage in joint sense-making with their counterparts and less capability to experiment out of the boundaries. As we noted, middle managers, with the power to make things happen concretely, were the most constrained in both CG and AT&T, by the hierarchical and bureaucratic nature of the organizations. The fact that both alliances were decided upon from the top obviously did not help, but the lack of room to learn at middle levels was not just a reflection of not having been part of the decisions. The difficulty ran deeper: even managers who could articulate and express a full commitment to the alliance success still found it difficult, under pressure, not to revert to familiar, and often more primitive, behaviors. While probably personally functional in their own organizational context these behaviors were dysfunctional at the interface between partners.

Alliance transitions

The intensity of cooperation which is feasible in an alliance early on—given information asymmetry, uncertainty, lack of trust, tentative institutional and personal commitments—is unlikely to be sufficient for the alliance to succeed. Yet, the level of cooperation needed to succeed would probably not be acceptable at the start; partners would shy away from such intense cooperation.

To succeed, alliances thus have to go through a series of transitions as they move from one learning, reevaluation and readjustment cycle to the next.

First are interpersonal transitions, as the participants in the alliance are able, or not, to transcend their organizationally prescribed roles. While organizationally prescribed roles provide a safety net early in the alliance (in particular when interpersonal understanding and trust are still low) they become straightjackets later on (Ring and Van de Ven, 1994). Strong institutional anchors also provide the safety to transcend pre-existing roles. Both AT&T and CG suffered from internal bureaucratic politics that made it difficult, and potentially dangerous, for individuals to step out of roles. This was not the case at AZ and Olivetti. As for GE and SNECMA, they were fortunate enough to start the alliance with the definition of new organizational roles (to serve civilian customers) still very much open to learning from the alliance. Organizational roles, in that alliance, rather than a source of learning blockage and inertia became a dimension of learning.

Interpersonal transitions were obviously made easier by small cooperative events early in the process, which allowed trust to develop sufficiently for individual participants in the alliance to step out of preexisting roles and to redefine these. This, in turn, gave the confidence on both the equity and adaptability dimensions of reassessment needed to work on the third dimension, i.e., to make the alliance design more efficient. This often required irreversible commitments (in particular when specific assets such as competencies resulting from cumlulative learning, have to be given up, practically foreclosing the option to get out of the alliance later. This was one of the stumbling blocks in the AT&T–Olivetti alliances: AT&T called for the use of an AT&T-proprietary processor in their joint mini-computer line; Olivetti was reluctant to make such a specialized commitment.

Yet, both the actual efficiency improvement coming from growing asset cospecialization in the alliance, and the growing mutual trust resulting from the ability to have made (jointly) irreversible commitments, contributed in turn to heightened expectations in more successful projects, such as TTS and CFM. These expectations, though, originated with the project teams and increased over time, in a process resulting from the project dynamics. This was entirely different from the high initial expectations imposed from the top in some other projects, with little actual commitment from members of the project team.

Alliances could still falter at this stage if the relative dependence was seen as asymmetric...
between the partners. For instance, one latent source of tension between GE and SNECMA was their willingness to push cospecialization as far as possible, but not so far as to compromise the ability of either company (and of course of SNECMA in particular as the newer smaller partner) to make a 'complete engine.' Each could obviously argue to the other that only the role of military domestic customers prevented them from reaching full cospecialization. This allowed each not to have to really test explicitly the strategic resolve of the other to accept cospecialization, and the irreversible mutual dependence it would bring.

Alliance development paths

Figure 4 sketches in summary form the more successful alliance development patterns we observed. In these alliances, each learning cycle reinforced the positive assessment of the alliance on all three criteria, and led the partners to be willing to make further commitments to the alliance to increase its scope and its stakes, and to achieve a higher level of complementarity and cospecialization between them. We could see the more successful alliance 'starting small and growing big' on all three assessment dimensions, along a development path that led the partners to increase their stakes, and match their commitments to the growing trust and joint adaptability between them. Again GE–SNECMA provides the most accomplished example of such an alliance development pattern, over the nearly 30 years of its existence.

IMPLICATIONS AND CONCLUSIONS

Limitations

The research reported here draws on a very small purposive sample, with an inductive model drawn from one case (including two contrasted projects, one successful, one unsuccessful), replicated and elaborated on two other alliances (another four projects), one successful, one unsuccessful. Findings and propositions drawn from a few case studies, no matter how carefully sampled and researched, obviously deserve healthy caution. Yet we believe this paper provides interesting insight into how the initial conditions of an interfirm alliance condition the cooperation process in the alliance and its outcome.

The choice of cases, in retrospect, probably affects the research findings. We controlled for the potential value of the opportunities our sample firms were pursuing—i.e., all our projects were aimed at opportunities where a market existed—and for the technologies and competencies of the partners—i.e., all the partnerships studied brought together the required technologies and competencies to address the opportunity successfully. The economic value of the alliance was potentially there. The issue was whether the partners

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![Figure 4. Alliance development path](image-url)
could combine their resources successfully, not whether they had them or not. Our most successful case, GE–SNECMA, however, is perhaps not strictly comparable to the other two: although GE was substantially larger than SNECMA, the suspicion of takeover was not present, given SNECMA’s status as a state-owned enterprise supplying the military, and the two companies were not so different, in relative size, as in the other alliances, at least if one considers only the aero engine group of GE. This may have led us to emphasize differences in initial conditions. An extension of this research could take a sample of alliances where the initial conditions are as similar as can be found, to heighten the opportunity to better research the impact of process differences.

The fact that we found evolutionary processes to have an impact, in at least some of our cases (e.g., TTS, PABX), despite the slanted initial conditions, suggests the importance of evolutionary processes. A follow-up sample might be of alliances where the initial conditions are more balanced than in the CG–AZ and AT&T–OL relationships, but not stably balanced as in the GE–SNECMA alliance.

Further, in all three alliances, the partners interacted in a relatively unbuffered fashion; i.e., they worked together closely rather than created a buffer organization or a joint venture. An extension of the research could consider learning processes in the context of joint ventures, and the patterns of convergence and divergence taking place when joint ventures are created on a more integral and autonomous basis (Salk, 1992).

In all our cases the strategic and the organizational context of the partners weighed heavily in how they approached the partnership. Strategic and operational interdependencies between what the alliance encompassed and what the partners kept doing separately played a significant role. More autonomous joint ventures would probably leave greater room for evolutionary processes to play a key role.

Implications

A first implication for further research is that applying an evolutionary perspective to inter-organizational dynamics seems to be worth the effort. While the underlying field research methods are unavoidably onerous, the interactive and iterative process of learning, revaluation, and readjustment might not have been visible to less clinical approaches. Conceptual developments (e.g., Ring and Van de Ven, 1994), or experimental approaches (e.g., Axelrod, 1984) are usefully complemented by empirical studies of the phenomenon. More empirical ‘messy’ research on strategic alliances as well as on other types of complex organizational process is needed (Parkhe, 1993a). Inductive grounded theory development remains useful when exploring a relatively unknown phenomenon, in which the unfolding of events over time plays a key role.

Second, such research can usefully combine units of analysis at various levels of aggregation. While we studied the expectations and the behaviors of specific individuals, and the development of interpersonal relationships, we did this in the context of projects—a second level of analysis—and of broader organizational and strategic contexts—a third level of analysis. The comparison of unequally successful projects in the same organizational contexts (or in our case interorganizational contexts) was particularly revealing as were, more obviously, the comparisons across alliances. Focusing only on individuals would have led one to concentrate on interpersonal relationships and to ignore, or not analyze in detail, the organizational and strategic contexts within which alliances unfolded; while focusing on strategic and organizational contexts would have led one to reify the organization.

Third, the research needs not only to bring attention to multiple levels—individuals, projects, organizational and strategic contexts—but it also needs to blend content (what the alliance task is), context (both organizational and strategic) and process, as these three aspects interact intimately, and focusing only on one would not allow to understand the various determinants of how alliances unfold over time.

Conclusions

Beyond the conclusions that are most directly characteristic of the alliance phenomenon, and which have been presented in the findings and discussion sections, the research reported in this paper makes two potentially important points relevant to the broader debate of teleological vs. emergent strategy processes.

First, as we suspected, it suggests that framing the debate in simple static vs. evolutionary terms
may not capture the essence of the phenomenon. In our observations, adaptive processes were neither just teleological nor emergent. Alliances were not just the implementation of initial designs toward set objectives, nor were they evolving independent from initial conditions. Initial conditions played a key role, but were either of a static type, blocking learning and adaptation, or of a generative type, fostering learning and adaptation. We found that the early imprinting was not necessarily static, and mutation was not random. The early imprinting could lead alliances down an adaptive dynamic development path by providing alliance partners with a capacity to ‘learn how to learn’ over a range of conditions, rather than lock them into a determined trajectory. By triggering learning cycles, initial conditions were a key enabler of alliance evolution. Imprinting a generative process to learn how to learn may lead to self-adjusting, but structured, evolutionary patterns, occurring through a sequence of learning cycles, that are neither emergent nor inertial: they are adaptive in content, and responsive to new conditions and to endogenous learning, but structured in process. Their content keeps shifting but their process repeats the loops outlined in Figure 1 and follows the sequence sketched in Figure 4.

Indeed, as we had also suspected, the tensions inherent to closely collaborating with a ‘foreign body’ heightened the conflict between inertial and adaptive forces in the alliances we observed, as compared to market arm’s length transactions or situations such as acquisitions, where the acquirer is usually dominant. This strong conflict between inertial and adaptive forces probably reinforced both the impact of small early events and that of the dynamics of role definition among alliance participants. The early cooperation process therefore had a disproportionate impact on the alliance evolution and on its subsequent content.

This would suggest taking a view of strategy process that transcends the static vs. dynamic or teleological vs. emergent dichotomies to explore the determinants of self-adjustment and adaptation in the way in which organizations evolve and to consider explicitly the learning capacity of organizational processes. The analysis of conditions that foster or block learning, as summarized on Table 3, is a step in that direction.

Second, the research reported here shows the critical role played by middle managers, and how they interact with others at other levels, in their own organization and across organizational boundaries, as a key feature of alliance evolution. In other words, strategy content, and outcomes, are hard to understand without an understanding of how participants in the processes that generate these outcomes interact. While this obviously imparts a greater burden on strategic management researchers, it shows the importance of a contextual process understanding of how strategies are formed.

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