

Designing the Boundaries of the Firm: From “Make, Buy, or Ally” to the Dynamic Benefits of Vertical Architecture

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The concept of “vertical architecture” defines the scope of a firm and the extent to which it is open to final and intermediate markets; it describes the configurations of transactional choices along a firm’s value chain. A firm can make or buy inputs, and transfer outputs downstream or sell them. *Permeable* vertical architectures are partly integrated and partly open to the markets along a firm’s value chain. Increased permeability enables more effective use of resources and capacities, better matching of capabilities with market needs, and benchmarking to improve efficiency. Partial integration promotes a more dynamic, open innovation platform and enhances strategic capabilities by linking key parts of the value chain. This permeable vertical architecture, accompanied by appropriate transfer prices and incentive design, facilitates resource allocation and guides a firm’s growth process. Our longitudinal study of a major European manufacturer suggests that to understand how firm boundaries are set and what their impacts are, we need to complement the microanalytic focus on transactions with a systemic analysis at the level of the firm. It also shows how, over and above transactional alignment, decisions about boundaries and vertical architectures can transform a firm’s strategic and productive capabilities and prospects.

Key words: firm boundaries; vertical architecture; vertical scope; organizational design; capabilities

Designing boundaries is a crucial aspect of organizational design. The case of Fashion Inc., a major European apparel manufacturer, illustrates the importance and potential benefits of boundary redesign. Fashion Inc. successfully redrew its boundaries to counter increasing competition and redress weaknesses of vertical integration. Our study documents this process and suggests that existing frameworks neither fully capture these changes nor explain the resulting benefits.

Fashion Inc., a “traditionally vertically integrated” firm, gradually instituted permeable vertical boundaries and allowed its units to both make and buy, as well as transfer downstream or sell. The redesigning of Fashion Inc. led to different degrees of permeability, i.e., different ways to interface with customers and suppliers, internal and external alike. The redesigning and resulting market penetration was based on expected systemic benefits, which are the focus of this paper.

Our study both complements and differs from existing theories about vertical scope and firm boundaries. First, it uses different units of analysis. Transaction Cost Economics (TCE) is mainly focused on conditions that lead firms to “make” rather than “buy” (Coase 1937, Williamson 1985), or to “ally” (Dyer 1996, Williamson

1999), taking a microanalytic approach, looking at “one transaction at a time.” Thus, research to date looks at the governance of transactions rather than the overall boundaries of any specific organization. This emphasis on transactions neglects factors that operate at the level of the *firm*, and may underpin vertical scope and affect productivity, systemic adaptation, innovative potential, and performance.

Our analysis also challenges the contrast between firms and markets. Analyses of “discrete structural alternatives”—that is, choices to make, buy, or ally—are so prevalent that we have often come to juxtapose firms and markets or “the hybrid” (Foss 2003, Williamson 1996). Yet, as Coase (1937) pointed out, *every* firm connects with markets to purchase inputs and to sell its goods or services; the question then, should be how exactly any given firm links with intermediate and final markets. To do so, we consider the links a firm has with final and intermediate markets at various levels of analysis: the Strategic Business Unit (SBU) or a step in the value-adding process; and the corporation as a whole.

We observe that rather than just “make” or “buy,” firms interface with final and intermediate markets in several different ways. At the SBU level, firms often

both make *and* buy inputs, and sell *and* transfer outputs downstream. Such “mixed modes” differ qualitatively from traditional integrated structures and require substantial process reengineering; we provide qualitative evidence on why such mixed modes are beneficial to SBUs and value chain segments.

Our analysis also considers the entire corporation, as we find that the benefits of these “mixed modes” accrue to the firm as a whole. To assess the way in which boundaries affect a firm, we put forth a new construct: We define *vertical architecture* as the overall structure of a firm’s value chain. Vertical architecture includes the choices of (1) where to participate in the value chain; (2) how to interface with internal and external suppliers and buyers at each stage of the value-added process; and (3) vertical and horizontal relations, including transfer pricing, resource allocation among SBUs, and managing divisional incentives. Thus, vertical architectures shape the pattern of transactional choices, and we find that they have important systemic properties that go well beyond transactional alignment. As Kay (2000, p. 685) put it:

Just as an architect might view a house in terms of style, form and function, so a burglar is more likely to see it as a pool of assets. In these respects at least, economists are more like burglars than architects since they tend to have more concern for aggregates and opportunity costs (and barriers to entry and exit) and less concern for intrinsic structural and systemic qualities.

Our paper examines the systemic properties of firm boundaries, and we consider how they shape firms’ capabilities.

Existing Theory

Coase (1937) was the first to observe that, in deciding on firm boundaries, entrepreneurs and managers weighed up the benefits of internal production against the costs and risks of using markets. With the introduction of TCE (Williamson 1985), the focus shifted to what determines the transactional costs of using markets to procure inputs or sell outputs. Given TCE’s microanalytic focus, vertical scope and boundary decisions became synonymous with decisions to make rather than buy—the emphasis being on how asset specificity relates to the extent of vertical integration (Shelanski and Klein 1995). The 1990s saw considerable debate over TCE findings and on what else could yield advantages from internalizing production. Kogut and Zander (1996) as well as Ghoshal and Moran (1996), for instance, suggested that firms are more than transactional havens; they provide organizational backdrops for sharing and applying knowledge.

Over the last decade, researchers have recognized the complexity of boundary decisions, and also considered when firms, rather than making or buying, forge alliances or participate in networks to exchange inputs or outputs (Dyer 1996, Powell 1990). TCE theory terms

these structures “hybrids,” a label that includes “long-term contracts, franchising, joint ventures and the like” (Williamson 1991, p. 80). Be that as it may, the key question asked was: When would an individual transaction be carried out internally, externally, or through an alliance? Several drivers of the individual “make, buy or ally” choice were put forth. The choice of integration over market procurement, e.g., could be the result of transaction costs (TC) and the fear of expropriation (Williamson 1985); of the desire to increase incentive alignment through integrated ownership (Grossman and Hart 1986, Hart 1995); of the need for superior monitoring or measurement that can be done in-house (Barzel 1981); of the inability to educate outside suppliers about desired properties (Langlois 1992, Silver 1984). Alternatively, integration could be chosen to allow a firm to capitalize on its comparative or competitive advantages (Argyres 1996, Gulati et al. 2005, Jacobides and Hitt 2005, Leiblein and Miller 2003, Teece 1986); or to foster knowledge sharing and coordination (Conner and Prahalad 1996, Kogut and Zander 1996). Most of this research on scope was microanalytic, looking at one, or a set of transactions.

More recently, research has considered how industry boundaries evolve, and how intermediate markets emerge (Jacobides 2005, Langlois 2003). It has also considered how capabilities, at the industry level, are affected by vertical scope; that is, how the nature of industry boundaries affects the evolution and the nature of capabilities in an industry (Cacciatori and Jacobides 2005, Jacobides and Winter 2005). Surprisingly though, little, if any research has looked at how the overall boundaries of *a given firm* are set, how they evolve, and how they affect that firm’s prospects.¹

Existing research has also not addressed some nagging empirical questions, such as the finding of Harrigan (1985) that firms oftentimes *both* make *and* buy the same input. What persuades them to use a mixed procurement strategy, because most research suggests that firms should *either* make *or* buy (Bradach and Eccles 1989)? Parmigiani (2004) proposed that a firm might buy the more generic, more easily tradable components while making the rest in-house. Heide (2003), following Dutta et al. (1995) and Arrow (1975), suggested that a small level of in-house production is a means to check on and to provide incentives for distributors or suppliers to price fairly, so that “plural forms may be a strategy for ‘managing’ markets” (Heide 2003, p. 26). Harrigan (1985) also suggested that firms use tapered integration to increase flexibility (Grant 2005, ch. 13) and bargaining power with suppliers and customers, and Jacobides and Hitt (2005) argue that tapered integration occurs as a result of firms’ effort to capitalize on uneven capabilities along the value chain. Still, the overall drafting of firm boundaries for any given firm received little attention.

Bradach and Eccles have further flagged the theoretical dilemma of “mixed” modes, which they defined as the “distinct organizational control mechanisms operating simultaneously *for the same function by the same firm*” (1989, p. 113). They argued that researchers should examine “the dynamics of whole [corporate] structures” (1989, p. 116), not just “individual transactions.” Bradach (1997) studied restaurant chains looking whether they own or franchise a restaurant and finding that they often do both. He concluded that the concurrent use of multiple forms can ratchet performance and enhance learning. His focus, however, is on asset ownership and franchising within one part of the value chain, specifically on “units in a restaurant chain [that] need to be similar” Bradach (1997, p. 299), as opposed to the “traditional” problem of vertical scope, i.e., whether a firm makes or buys its inputs and whether it integrates forward into distribution.

Summing up, although research has focused on why firms may want to buy or make, firms’ boundaries have received little attention, either at the SBU or the corporate level. Researchers have examined whether and when a firm would make rather than buy, but have ignored overall firm boundaries and how they affect a firm’s effectiveness and prospects. This provides the opportunity for a new line of inquiry. As Santos and Eisenhardt (2005, p. 504) noted: “Process research can more readily uncover the causal mechanisms shaping boundary formation... This may allow the field to move way from simple contingencies to deeper understanding of the complex and evolutionary role of boundaries in organizations.” Our study is an effort in this direction.

Methods, Data, and Context

Methods

This research involves a case study of Fashion Inc., a major European designer and manufacturer of men’s, women’s, and children’s clothing. Fashion Inc. sells primarily to independent retailers or department stores. In 2002, Fashion Inc. generated revenues of well over €250 million and employed almost 4,000 people in Europe. We conducted a qualitative study over 38 months that involved direct observation of key parts of the corporation’s redesign process. The setting was chosen on conceptual grounds, rather than because of its representativeness (Firestone 1993). To study and understand firm boundaries, we chose a firm planning a large-scale vertical redesign effort.

We used multiple sources of evidence: archival data, industry publications and manuals, company documentation, workshop participation, and employee interviews. We looked for evidence that might inform existing theory, and we were open both to the use of existing

constructs (which guided our work) and emerging constructs. We wanted to understand (1) the nature and function of the firm’s boundaries; (2) how the firm’s management and personnel designed their boundaries (i.e., how they chose what to make, buy, transfer downstream, sell, or whether to ally); and (3) the rationale behind how the firm set its boundaries. We focused on what the firm did or did not do in-house, and why.

Participant observation and theory generation followed a cyclical process. As we identified constructs and created theoretical frameworks, we sought clarification from the data, which, in turn, led to further theory development (Yin 1994). We shared our developing theories and conceptualizations with industry participants and other researchers who had studied the company.

Data

The research started in May 2002 when the company was considering changing its vertical structure. Fashion Inc. sought academic input into the operational implementation of its design from the research institute of one of the authors (see also Billinger 2005). We adhered to the methodology established for researchers who participate in organizational change (Miles and Huberman 1994). The study had three phases between May 2002 and July 2005.

Throughout the project, we reviewed internal documents, such as the SBU’s business plans and information on their structure and processes, and employee surveys. We participated in the reengineering team’s twice-monthly milestone workshops, where senior managers discussed Fashion Inc.’s change process. Also significant was our participation in the 146 internal workshops initiated by top management. We participated in most meetings that related specifically to changes to the firm’s boundaries. So, we had access to rich data, and experienced the redesign of the firm’s boundaries. Table 1 summarizes the data sources and shows how evidence was used.

Table 2 summarizes the workshops, where top management debated decisions about changes to Fashion Inc.’s vertical structure. These workshops involved all relevant employees as well as top management. When the firm was implementing changes, top management discussed and signed off on actions every two weeks. This provided a unique level of intersubjective agreement about both nature and drivers of firm boundaries. Because the firm was keen to keep an accurate record of the change process, minutes were written following each workshop and outcomes written for the company archives. Workshop participants reviewed these records to ensure accuracy, and we accessed them to augment and confirm our perceptions. The company also reviewed our progress reports, assuring accuracy about our understanding of the firm’s change process.

Table 1 Sources of Evidence Throughout the Project

Sources of evidence in each stage of the project	Phase 1: June 2002–January 2003	Phase 2: January 2003–February 2004	Phase 3: February 2004–July 2005
Primary sources of data	<ul style="list-style-type: none"> • Workshop participation, workshop documentation (i.e., handouts, workshop transcripts, working documents, process maps) • Project management documentation • Personal research notes • Internal documents • SBU business plans • Ongoing discussions with project management team, as described in Table 2; initial discussion and framing 	<ul style="list-style-type: none"> • Workshop participation, workshop documentation (i.e., handouts, workshop transcripts, working documents, process maps) • Documentation for IT requirements • Project management documentation • Internal documents • Personal research notes • Employee survey • Ongoing discussions with project management team, as described in Table 2 	<ul style="list-style-type: none"> • Workshop participation, workshop documentation (i.e., handouts, workshop transcripts, working documents, process maps) • Internal documents • Personal research notes • Project management documentation • IT design documents • Ongoing discussions with project management team, as described in Table 2 • Semistructured interviews to confirm theory building, as described in Table 2
Secondary sources of data	<ul style="list-style-type: none"> • Historical studies of Fashion Inc. • Sector descriptions • Research papers with apparel focus • Analyst reports 	<ul style="list-style-type: none"> • Sector descriptions • Press releases • IT manuals • Company manuals 	<ul style="list-style-type: none"> • Sector descriptions • Press releases • IT manuals • Company manuals
Company events involved in	<ul style="list-style-type: none"> • Workshops as described in Table 2 • Firmwide gatherings (one presentation of the new collection, firm anniversary, two firm parties) 	<ul style="list-style-type: none"> • Workshops as described in Table 2 • Firmwide gatherings (one presentation of the new collection, two firm parties) 	<ul style="list-style-type: none"> • Workshops, as described in Table 2 • Firmwide gatherings (one presentation of the new collection, one firm party)

In Phase 1 of the research, from June 2002 to January 2003, we studied the industry and interviewed 116 employees to familiarize ourselves with Fashion, Inc. To identify the problems caused by Fashion Inc.'s new vertical structure, we met weekly with the reengineering team, twice monthly with senior management, and participated in 8 workshops, involving 205 employees. Between October 2002 and mid-January 2003, we attended 14 strategy workshops, which focused on implementation, involving 75 employees. In Phase 2, between January 2003 and February 2004, we attended 65 workshops including 43 employees, during which time Fashion Inc. finalized its new vertical structure. We reviewed documentation on information technology (IT) infrastructure and specifications for the new layout. During Phase 3, between February 2004 and July 2005, we collected additional data to clarify and confirm our theory. We maintained weekly contact with Fashion Inc. to follow changes. We also met with internal reengineers and managers about changes, and conducted 21 final interviews with a wide variety of employees (see Table 2).

The Broader Context: The Apparel Industry and Evolution of the Value Chain

The value chain falls into four distinct parts as depicted in Figure 1: (1) Fiber and Fabric, (2) Cut, Make, and

Trim (CMT), (3) Original Brand-Name Manufacturing (OBM), and (4) Retail. Many firms currently opt for a disintegrated model, focusing on their areas of competency. A few firms, such as Zara and Benetton, are successfully vertically integrated (Camuffo et al. 2001, Ghemawat and Nueno 2003). They derive a competitive advantage from being flexible and fast, while maintaining high quality allowing integrated manufacturing in high-cost areas such as Western Europe. Integration is important for the high fashion segment, as it helps facilitate rapid responses to changing trends (Richardson 1996).²

The Why and What of Redesigning Fashion Inc.'s Boundaries

Fashion Inc. is an established apparel manufacturer involved in all stages of the value chain except the production of fibre: It owned fabric and CMT facilities, all over Europe, and OBM activities were located at its Western Europe headquarters. It had superior logistics, design, and responsive manufacturing and was considered a high-quality producer. Yet, with increasing globalization, growth of both low-cost and fashion segments, and decline of the midmarket segment, Fashion Inc. was in a tough spot. The company tried to react, first by

Table 2 Workshops Involved in/Attended During the Project, per Objective and List of Interviews, Meetings

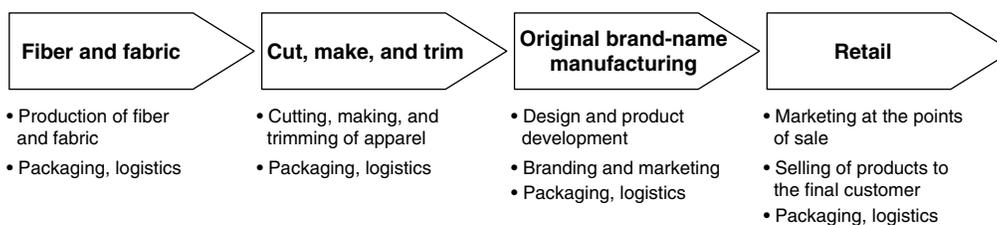
Type of workshop—dates	Number of participants	Number of workshops	Main objective of workshops	Demographics of workshop participants
June 2002–January 2003				
Weaknesses in the former processes in 2002				
• Product development	40	1	<ul style="list-style-type: none"> • Identification of operational weaknesses, i.e., double-check loops • Brainstorming on possible improvements 	<ul style="list-style-type: none"> • Employees and middle management, including all key persons of operations • 50% of which were more than 10 years with Fashion Inc.; 25% between 5 and 10 years; 25% less than 5 years
• Sourcing	15	1		
• Order processing	40	1		
• Customer relationship management	20	1		
• Manufacturing (in four different countries)	90	4		
October 2002–January 2003				
Strategy				
• Market analysis	10	2	<ul style="list-style-type: none"> • Translation of SBU business plans into operations • Strategic framing for process redesign 	<ul style="list-style-type: none"> • Top management • Representatives of the reengineering team • 30% of which were more than 5 years with Fashion Inc. • 70% of which were less than 5 years with Fashion Inc.
• Business processes	10	2		
• Development	10	3		
	15	3		
• Implementation	15	4		
• Quality and review				
January 2003–December 2004				
Process redesign and implementation				
• Product development	20	25	<ul style="list-style-type: none"> • Design and implementation of future processes with optimized interfaces • Identification of SBU-specific and generic processes 	<ul style="list-style-type: none"> • Middle management and motivated key persons of operations • 95% of which were at least 5 years with Fashion Inc.
• Sourcing	10	15		
• Order processing	10	20		
• Customer relationship management	3	5		
October 2003–February 2004				
Selection of IT platforms				
	15	3	<ul style="list-style-type: none"> • Design of IT prototypes • Selection of future IT 	<ul style="list-style-type: none"> • Middle management and motivated key persons of operations • 95% of which were at least 5 years with Fashion Inc.
June 2002–July 2005				
Regular milestone and project meetings				
• Project review meetings and discussions	21	108	<ul style="list-style-type: none"> • Project management of the change project 	<ul style="list-style-type: none"> • 30% more than 20 years with Fashion Inc.
Interviews				
• General setting	21	21	<ul style="list-style-type: none"> • Verification of research layout, tentative and final findings 	<ul style="list-style-type: none"> • 40% more than 10 years • 30% less than 2 years

redrawing its geographical structure. By the early 1990s, CMT, the most labour-intensive process, had to relocate for the firm to remain competitive. Fashion Inc. acquired CMT facilities in Eastern Europe and divested facilities in Western Europe. This relieved the situation for several years, but ultimately was not sufficient.

With increasing competition in retail markets, Fashion Inc. realized that they had to relocate fabric production

to Eastern Europe. By 2001, most midpriced brands, including Fashion Inc.'s, were under severe pressure and there were problems with its existing distribution channels. Fashion Inc. sold to independent retailers and major department stores and found itself unable to sell effectively, as the relative position of its retailers dwindled. It became increasingly difficult for Fashion Inc. to compete with rising global brands (DeutscheBank 2002)

Figure 1 The Apparel Value Chain



because of downstream weaknesses in sales, marketing, and distribution.

Given this backdrop, Fashion Inc. executives decided to react. Initially, executives considered outsourcing manufacturing—a choice made by several competitors. Yet, this idea had shortcomings. Profit could result from all steps in the value chain. For Fashion Inc., divesting manufacturing facilities would jeopardize a relatively stable part of its business, introducing uncertainties and volatility. As a top manager from a manufacturing facility said: “Our business runs very well—why should we get rid of it?” The firm also recognized that the changing trends in OBM could be turned into an advantage, by offering new services that would assist other apparel manufacturers in their own repositioning. Fashion Inc.’s marketing manager said: “Many competitors outsource—why shouldn’t we help them?” Senior management believed that other companies interested in outsourcing could use Fashion Inc.’s capabilities. Conventional transactional risks driven by asset specificity were not significant,³ and Fashion Inc.’s management considered that providing intermediate inputs to its downstream competitors would not be a grave strategic threat; more importantly, “opening the firm up” could, it was believed, make the firm more competitive. Managers thought that sheltering units by not opening up was neither advantageous nor tenable in the long run; true competition, they reckoned, would make the firm stronger, not weaker. Fashion Inc. also did not need to create new intermediate markets; it could just open itself up to existing ones.

Having decided to open up its value chain, Fashion Inc. created a blueprint for boundary redesign. Five key questions were asked for each part of the value chain: (1) Does a market exist and is it accessible and attractive? (2) Does the new business opportunity fit the corporation’s overall strategy? (3) Does the new business opportunity generate an adequate return on investment (ROI)? (4) Does the firm have abilities and resources to address the specific market or can it acquire them within a reasonable timeframe? (5) Does the new business opportunity threaten existing business?

Having assessed its entire value chain, and to serve both internal and external clients, Fashion Inc. decided to establish three SBUs. First, the Fabric Unit offered its excess production capacities to outside customers, thereby exploiting internal economies of scale, while offering small production lots to outside customers. Second, the CMT Unit made excess production capacity potentially available to external customers. Third, the Service Unit offered its design, sourcing, packaging, and logistics capabilities to external customers. The Service Unit also established a subdivision, the Outlet Unit, to handle direct sales.

The creation of this new SBU structure entailed substantial reengineering. A team comprising members

from several departments worked full time on this project, supervised by the CEO. Initially, the team identified and analyzed the existing operational processes; more than 205 employees as well as 2 researchers (including 1 of the authors) participated in this process mapping and redesign exercise.

Fashion Inc.’s vertical redesign effort incorporated three major steps.⁴ First, processes required complete redesign to accommodate modular interfaces between business units, such as standardizing information and routines (Baldwin and Clark 2000, Sanchez and Mahoney 1996). Fashion Inc.’s SBUs became more flexible and process reorganization allowed the firm’s boundaries to open to the market. Before redesign, e.g., Fashion Inc. rarely subcontracted excess manufacturing capacity in both the Fabric and CMT SBUs. An organizational blueprint for a generic order process (for final and intermediate goods) became feasible after new processes and a new, state-of-the-art IT/enterprise resource planning (ERP) system was installed to enable vertical disaggregation.

The next step was organizational design. New job descriptions and areas of oversight supported the new processes and structures. Another change was the creation of a new set of legal entities. In doing so, top management had three concerns. First, the new legal structure should mirror, if possible, the emerging independent “vertical modules.” Second, the potential tax and regulatory benefits should be positive. Third, union demands had to be taken into account, especially in Western Europe. Interestingly, we observed that modularity in legal and governance terms (what economists tend to focus on) did not fully map onto organizational modules. It was also not as critical as process or organizational modularity.

Finally, it was extremely important to create a dynamic set of rules governing the relationships between vertically related units.⁵ The establishment of a profit and loss (P&L) structure for each SBU (and within some of the SBUs) revealed the need to explicate transfer prices. Fashion Inc. implemented a “cost plus” model to compete with market prices (see Eccles and White 1988, p. 40), a choice partly motivated by international taxation rules (Grubert and Mutti 1991). The creation of separate administrative structures along the company’s value chain helped the firm to open up its boundaries. Thus, P&L structures precipitated vertical disaggregation by creating “organizational discontinuities” along Fashion Inc.’s value chain (cf. Jacobides 2005, p. 482).

Initial indications are that the changes are working out well. The firm’s revenues and profitability have increased markedly, despite worsening industry-wide conditions, which have led several competitors to bankruptcy. The new vertical structure means that SBUs use resources and capacities to greater advantage. In addition, Fashion Inc. has broadened its customer base

and retail markets, increased cross-unit sales and welcomed several new business opportunities.

The disaggregation of business units significantly increased transparency within Fashion Inc. As the CFO pointed out: “If you can’t measure it, you can’t manage it.” Improved performance transparency allowed a better evaluation of ROI, and better management of assets along the value chain. Senior management, as well as the firm’s owner, considered the redesign to be vital for the long term success of the corporation, not a temporary solution. Managers believed that these were long term and constituted a blueprint for the future. As the CEO said, “With the old [vertically integrated] strategy, we would not be at the point we are today.”

Increasing Permeability: Opening Up the Boundaries Without Changing Scope

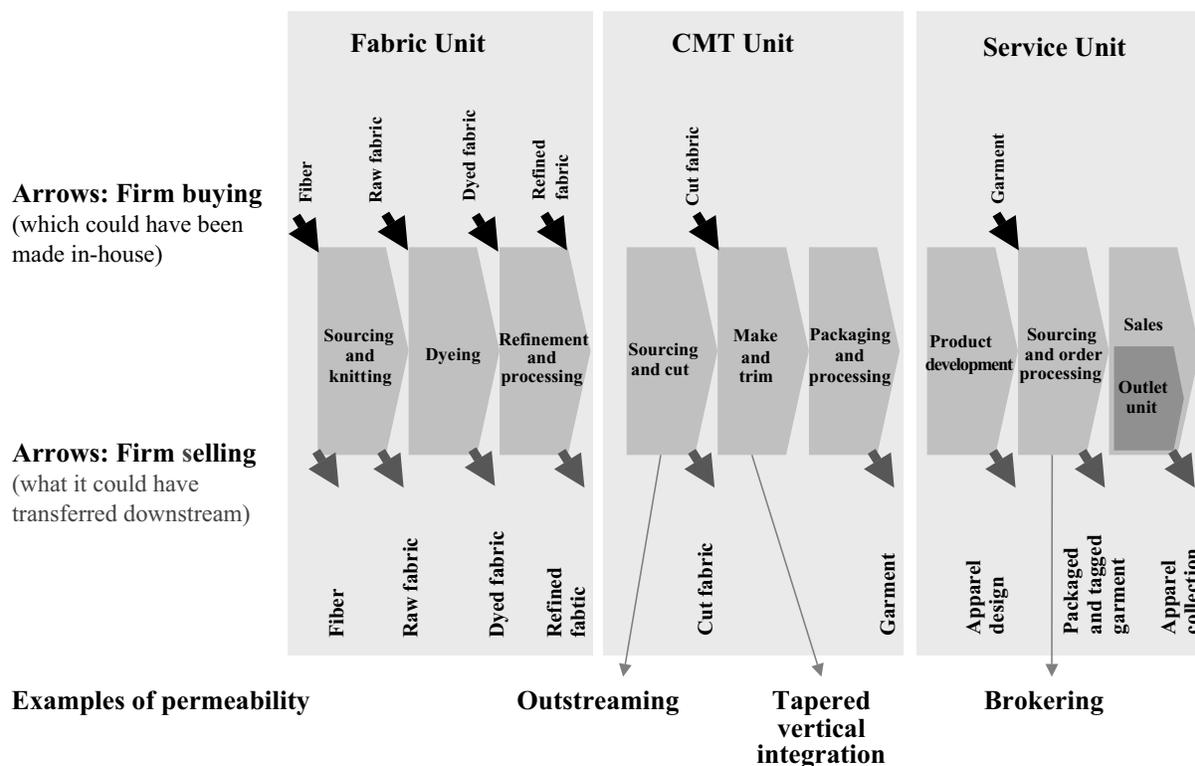
Fashion Inc. disaggregated vertically and opened up its boundaries, and became both a buyer from and a seller to intermediate markets. In doing so, it changed its boundaries in a way that traditional research has a hard time describing. A traditional value chain depiction focuses solely on whether a firm undertakes value-adding steps or not. Our analysis suggests that there are additional options to making in-house, buying, or forming alliances. For instance, in addition to integration and specialization or outsourcing, some units in Fashion Inc. began engaging in mixed modes, which we termed

outstreaming, brokering, and tapered integration. *Outstreaming*, for instance, entailed using internal suppliers, and transferring downstream plus selling to external buyers on intermediate markets; *brokering* entailed suppliers and transfers downstream and selling to external buyers, and *tapered integration* consisted of using internal and external suppliers and transferring downstream (Harrigan 1985). Figure 2 shows the new value chain that identifies the firm’s increasingly permeable vertical architecture.

To better describe vertical scope in the value-adding process, Figure 2 shows whether a unit interfaces with markets on input or output sides, or both. Interfacing with markets affects the nature of a unit. For instance, shifting from internal to external buying means developing new sourcing capabilities, monitoring performance, and creating new inbound logistics. Likewise, shifting from internal to external selling requires competencies in marketing, in connecting to outside buyers, and creating an infrastructure to handle external sales.

The analysis of how exactly a unit links to up- and downstream markets leads us to the construct of *permeability*, which operates at the level of the stage in the value-adding process (that can also coincide with the scope a SBU). Permeability can be seen in Figure 2, where the arrows at the top of the figure represent inputs bought from intermediate markets and where the arrows at the bottom represent sales to intermediate markets. As Figure 2 shows, Fashion Inc. maintained

Figure 2 Fashion Inc.’s Current Value Chain: A Permeable Vertical Architecture



its vertical scope while new external suppliers and customers entered along its own value chain. So permeability of several vertical units increased, although its aggregate scope did not change. Yet, why should Fashion Inc. adopt such a complicated structure?

We first considered whether Fashion Inc. made only the transactionally risky inputs, procuring the rest on the market. We thus looked at the product category and rather than considering sourcing, say, for “refined cotton textile,” we went to increasingly more detailed levels, looking at the sourcing (or selling) of “jersey” and then “single jersey, 100% cotton, with standard colours.” Even within such categories, mixed procurement persisted. Occasionally, Fashion Inc. would even both buy and sell the same type of fabric. The same pattern also held for innovative products. Our evidence and interview data suggested that mixed procurement was not the result of transactional heterogeneity and associated coarse measurement. So what drove it?

From interviews, we realized that at the SBU/value chain segment level, it was advantageous for Fashion Inc. to open up its boundaries to manage capacities and leverage differentiated capabilities along the value chain. Thus, having external customers in addition to downstream transfers can ensure that upstream production is buffered against cyclical risks of reduced internal demand (Thompson 1967). By catering to external customers, for instance, the Fabric Unit smoothed demand, thereby allowing it more effective use of resources. More important, this also shielded the Fabric Unit from declining demand from the ailing downstream CMT and OBM Units. Both buying and selling inputs also allowed Fashion Inc. to match differentiated capabilities in the value chain. For instance, the Fabric Unit developed a special “functional fabric.” Yet, as Fashion Inc.’s own brand could not fully use the capability, the Fabric Unit successfully offered its R&D capabilities to outside firms.

Vertical Architecture: The Organizational and Strategic Logic of Firm Boundaries

As we probed deeper into the company’s vertical structure, we realized that most benefits were located at the level of the corporation. These benefits, though, were the joint result both of vertical permeability *and* of the mechanism used for interdepartmental coordination and incentivization.

To better understand how these benefits emerge, we propose the construct of a “vertical architecture,” which describes vertical structures at the corporate level. Vertical architecture consists of choosing (1) where to be active in the value chain; (2) how to interface suppliers and buyers along the value-added process; and (3) vertical and horizontal relations, including transfer pricing, inter-SBU resource allocation, and managing

divisional incentives. Vertical architecture, which defined the *configuration* of transactional choices, became a way to improve the firm’s efficiency and effectiveness, enhancing learning and monitoring (Sabel 1994), and allowing for superior resource and capital allocation (Burgelman 1991).

Fashion Inc.’s new vertical architecture changed the way its employees worked, cooperated, and took responsibility and initiative within their divisions. As the CEO said:

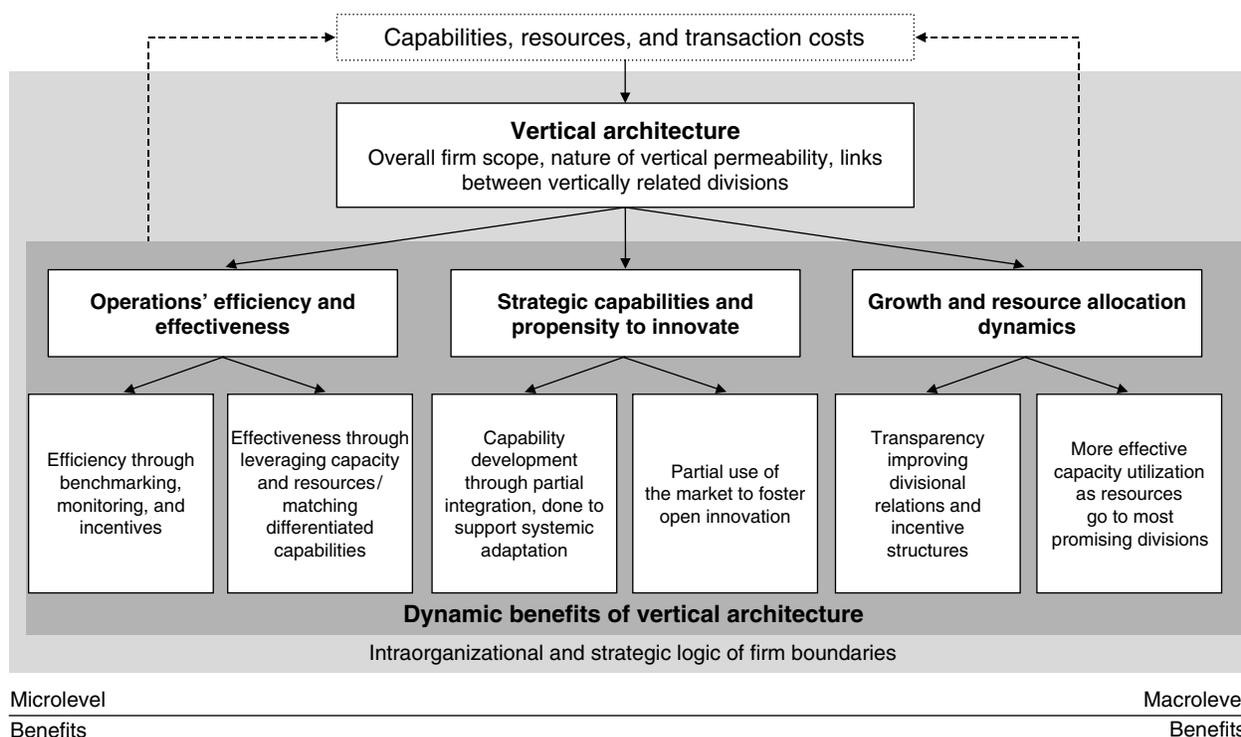
Change could not be achieved by the mere announcement of corporate values, but only through daily living. It starts during the daily interaction between the SBUs...and is supposed to end with newly defined roles and ways of interaction...not only within internal but also external interaction [with the market].

As Figure 3 indicates, the new permeable vertical architecture changed behaviours and provided three types of dynamic benefits for the organization. First, it enabled efficient and effective operations through competitive benchmarking and monitoring along the value chain. Second, a vertical architecture fostered strategic capabilities and nurtured innovation through a more open structure. Third, it allowed better resource allocation and more effective growth (Lovas and Ghoshal 2000) while providing greater transparency and accountability.⁶ Let us consider each benefit in detail.

First, Fashion Inc.’s improved use of capacity and resources helped to match its own upstream and complementary downstream capabilities. In-house production became more efficient because it was benchmarked against other noncaptive firms, allowing Fashion Inc. managers to identify problem areas and best practices alike. This could not be done by vicarious information or “asking for prices.” As the CFO put it: “In non-commodity markets with a limited amount of suppliers, it only makes sense to ask for prices if you have the willingness to actually place the order.” Placing an outside order, over and above transactional and cost considerations, can be seen as an investment that infuses the firm with discipline through its active participation in intermediate markets (see also Billinger 2005).

The second set of dynamic benefits that a vertical architecture brings concerns the fostering of strategic capabilities and the propensity to innovate as a function of the scope of the firm (Chesbrough and Teece 1996, Jacobides and Winter 2005). On the one hand, *partial* integration ensured that the corporation as a whole could provide an orchestrated response to environmental changes, so that, e.g., the Service Unit’s ties to Fabric R&D allowed it to produce fabric that would reflect current market trends. Furthermore, partial integration also helped foster corporate quality management by using vertically adjacent divisions to foster improvements, which were then shared throughout the firm.

Figure 3 Vertical Architecture and Its Impact on Organizations



Yet, while partial integration yielded strategic benefits, partial use of the market facilitated innovation and increased “absorptive capacity” (Cohen and Levinthal 1990). Fashion Inc.’s executives encouraged the purchase of innovative materials and services because they were necessary downstream inputs, but they also provided the impetus for Fashion Inc. to produce state-of-the-art products internally. For instance, should a Service Unit project manager identify a new fabric, she would use it for her own purposes in the Service Unit. Additionally, the Fabric Unit could benefit from her experiences and knowledge regarding the latest fashion trends. This could increase market responsiveness and the capacity of the Fabric Unit to develop innovative products. Thus, increasing permeability promoted a more “open innovation” platform (Chesbrough 2003).⁷

Third, vertical permeability guided resource allocation. This avoided having to rely on subjective or pro forma assessments about which division needed more investment, and which division was well managed. Divisions that were not competitive (in terms of “selling” their capacity internally or externally) were left to gradually decline, while divisions that were efficient received more funding and greater capital investment. This mechanism for resource allocation and evaluation was intricately related to the extent of permeability: Having the market as a safety valve, an upstream unit could not blame poor performance on the weaknesses of downstream units, and vice versa. Thus, Fashion Inc. avoided the problem of vertical integration, which is that

any given firm is as good as its “weakest link”: After redesign, the relative strengths and weaknesses of divisions become more visible, and resource allocation and managerial evaluation more robust.

At the corporate level, then, there is a logic that transcends choices made by each specific SBU regarding firm boundaries. Yet to understand this logic, we must also consider the transfer pricing mechanisms (Eccles and White 1988), and managers’ incentives to work together and with the market. As for transfer prices, Fashion Inc. allows units to set their own prices relatively freely (international taxation rules notwithstanding), and sell either directly downstream or to outside parties. As for incentives, to ensure that the units also deliver on quality, part of the divisional management appraisal was based on interdivisional relations. For instance, if a substantial number of defective products were encountered in the Service Unit, and mistakes could be systematically tracked back to the CMT Unit, managers and employees in the upstream CMT Unit would have their personal targets for the following year defined to address these issues. Furthermore, to avoid parochial attitudes, 50% of each manager’s bonus directly reflected individual and divisional performance and 50% was based on overall company performance. With these more robust incentive structures in place, Fashion Inc. also increased the percentage of managerial pay contingent on performance. As a result of both the incentive design and the use of the market, Fashion Inc.’s

vertical disaggregation promoted efficiency and effectiveness, and capitalized on market-generated information (Hayek 1945) without truly “mimicking the market” (Foss 2003), or leading the severe interdivisional frictions associated with multiple P&Ls (Eccles and White 1988).

This subtle but theoretically important point suggests that the market can infuse the firm with information, without a drastic wholesale change in compensation. Rather than engaging in “selective intervention” (Foss 2003, Williamson 1985, Zenger and Hesterly 1997), Fashion Inc. engaged in “selective information infusion,” to create performance targets for its divisions and guide effort and resource allocation.

Discussion

For three years, we studied an organization that successfully changed its vertical structure with resulting increases in efficiency and profitability. How the firm changed and the nature of the benefits were not entirely consistent with existing research. First, when Fashion Inc. changed its boundaries, it did not drop part of its value chain to become more vertically specialized. Rather, it increased its permeability by opening up to intermediate markets. Second, our study explains how firms choose and change their boundaries through managing the vertical permeability of the value-adding process. This approach complements the TCE tradition by identifying factors that have long-term effects. We argue that in addition to trying to achieve transactional alignment, firms chose their boundaries to improve their prospects.

We also explain why firms concurrently use both internal and external supplies and customers. Such vertically permeable structures, as Harrigan’s (1985) research implies, appear to be prevalent and stable, rather than anomalous and transient. We extend the research by Dutta et al. (1995), Heide (2003), and Parmigiani (2004) by suggesting that these mixed modes’ motivation is not necessarily to use partial integration to check on the market and to ensure fair pricing by suppliers and distributors, but also to use the market to infuse the firm with discipline and ideas.

Our paper also extends current research on the coevolution of capabilities and firm boundaries (Cacciatori and Jacobides 2005, Jacobides and Winter 2005), and on “open innovation” (Chesbrough 2003), by showing exactly how vertical architectures affect capabilities at the level of the individual *firm*. As Figure 3 illustrates, a permeable vertical architecture goes well beyond the “make, buy, or ally” choice or the static alignment to the transactional environment. A vertical architecture can improve transparency and monitoring, lead to greater efficiencies and more effective operations, affect capital allocation, support strategic objectives, facilitate innovation, and dynamically shape the firm.

Our core contribution lies in identifying how more or less permeable SBUs are “bound together” through vertical architecture, which defines permeability, the transfer price system, and divisional incentives. Each vertical architecture has a distinct logic; we argue that to appreciate the impacts of firm boundaries, we need to study scope, corporate incentives, and transfer prices concurrently. Because vertical architectures operate at the level of the firm, we need to complement the microanalytic study of transactional choices (Williamson 1985) with the systemic role of a firm’s manifold boundaries.

Our findings are also relevant to modularity research (Baldwin and Clark 2000, Schilling 2000). Integration, in the sense of owning all the steps of the production process, does not preclude modularization. Our findings suggest that it may be empirically risky to speak as Langlois (2003) does of firms as “islands of modularity”: Firms may have more or less modular structures.

Furthermore, this paper could help bypass some confusing, often inconsistent discussion of “hybrids” (Foss 2003) by providing a vocabulary to better describe vertical scope. Much of the confusion in the literature might come from interchangeably considering choices to “make, buy, or ally” and the overall vertical boundaries of any one organization. Yet, we should not confuse the architectural logic behind a firm’s boundaries or the patterns of interfacing with markets with the individual make versus buy decisions. To wit, Fashion Inc. is not merely a “hybrid”; it has a vertically permeable structure with a distinct rationale both at the SBU and the corporate level.

By identifying the specific advantages resulting from a vertical architecture, we emphasize dynamic benefits. Appropriately designed boundaries allow firms to change and improve their own operations, strategic and productive capabilities, innovation potential, and resource allocation processes. Our analysis considers boundary redesign as a tool to improve organizations; other firms might benefit from emulating the principles that we observed in Fashion Inc.

Limitations

With theoretical implications aside, this paper has some limitations. First, we have not discussed the process of the changes in Fashion Inc.’s vertical architecture, including the role of process redesign and changes in the information technology infrastructure that enabled the permeable structure (see also a companion paper Billinger and Jacobides 2006).

Second, we focus on the traditional concept of vertical boundaries, defined as whether a step of a value-adding process, is internalized by the firm versus being undertaken by other parties. Yet, several other types of boundaries are relevant and important. As Santos and Eisenhardt (2005) show, vertical boundaries and boundaries of power, competence and identity relate and complement

each other. Furthermore, partly because of the specificities of our setting (Fashion Inc. had not franchised), we have not considered the extent of asset ownership (Hart 1995) and the associated use of franchising (Bradach 1997) at any one step of the value chain, as it relates to our narrowly defined analysis of vertical scope.

Third, although we did track the impacts of a particular vertical architecture, our evidence does not provide general data about the relative merits of a permeable versus an integrated structure versus a set of entirely independent, cospecialized entities. We also did not focus on the trade-offs between the fixed costs of the redesign of a firm's boundaries against the dynamic benefits that accrue. Furthermore, we did not discuss what makes vertically permeable architectures possible in the first place, or explicate the conditions under which integrated but vertically permeable structures become problematic.

More generally, we chose Fashion Inc. for reasons of appropriateness rather than representativeness, so the extent to which we can generalize from Fashion Inc. requires additional research. Transaction costs and asset specificity are relatively low in this setting, and this raises the possibility that mixed modes might be feasible only in such conditions (cf. Chesbrough 2003). Similarly, in other settings, the risks of cannibalizing downstream sales (through providing competitors with upstream supplies) may outweigh the benefits of more transparent and permeable architectures.

Concluding Remarks

The ability of vertical architecture at Fashion Inc. to facilitate change and transform a firm's competitive prospect calls for a better understanding of vertical architectures at the level of the corporation. The ability to use permeability as a driver of dynamic benefits throughout the firm should be taken seriously. Casual empiricism suggests that several organizations are using similar models. Analysis of vertical architecture and the distinct modes of vertical permeability could thus provide a useful tool to better understand new organizational forms and their logic (Daft and Lewin 1990).

Our study suggests that to understand firm boundaries, we should consider their systemic impact on a firm's capabilities. We speculate that, while microanalytic studies of individual make-or-buy choices have helped to advance our knowledge, we may have reached the area of diminishing returns. Yet, new opportunities emerge once we shift the level of analysis from the transaction to a firm's manifold boundaries as they evolve. The analysis of how firm boundaries, transfer prices, and corporate incentives jointly shape a firm's capabilities and innovative potential holds promise for future research. We hope that this study will generate follow-on research on when each vertical structure, permeable or not, can be useful or destructive to the organization employing it.

Finally, the study of how external firm boundaries and internal firm structures interact to shape a firm's effectiveness and capabilities could help rekindle interest in a neglected aspect of organizational design. This could lead to a broader study of the *architectural principles of organizations* (Jacobides 2006). Armed with this fresh perspective, we could help create more effective organizations.

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Endnotes

¹A recent exception is Jacobides and Winter (2006), who consider how *entrepreneurial* ventures set their boundaries. Their argument is that while TCs are part of the entrepreneur's calculus on "make or buy," the entrepreneur primarily cares about maximizing the returns on scarce cash. Thus, relative returns (in terms both of profitability and asset appreciation) in each part of the value chain; the extent of opportunities along the value chain; and the relative scarcity of cash, all affect the ventures' overall scope. This analysis shows that by changing the focus from the transaction to the firm, TCs are neither necessary nor sufficient for integration to occur; it also illustrates other factors in play.

²Since the early years of the twentieth century, the value chain in this very mature industry has been shifting first toward geographical disaggregation (with firms locating parts of their operations abroad) and then toward vertical disintegration (with firms specializing in different parts of the value chain). A variety of organizational and institutional structures has thus proliferated, all of which coexist (Richardson 1996). The "traditional" structure of the early part of the twentieth century was "full integration." However, the increasing availability of cheap labour in developing countries led to a relocation of most labour-intensive steps of the value chain, starting with CMT and moving to Fabric, and, ultimately, OBM (Gerffi 1999). As a result, some firms focused on design or marketing, while others built competencies in logistics and sales; some firms chose to increase their competencies in all of these value-adding activities, while others focused their expertise and became vertical specialists. The trend toward specialization was encouraged by the success of large firms that pursued only branding and marketing (e.g., Levi Strauss).

³In the apparel industry, manufacturing technologies have been relatively stable. New products involve mainly styling or fabric changes that usually do not require new technology. Hence,

investments in manufacturing assets are not subject to great risk of obsolescence and could usually be redeployed or divested (Richardson 1996). In the last few years, there have been no substantial changes in asset specificity in the sector (see Gereffi 1999). Also, the relatively small duration of contracts and limited switching costs de facto protects firms from ex post opportunistic renegotiation.

⁴The process, of course, was not quite as orderly and linear as this description implies. The opportunities for accessing new intermediate markets did not only emerge as the result of a top-down analytical approach; they had also appeared as earlier, sporadic, unsystematic efforts to capitalize on the opportunities in different parts of the value chain. For instance, CMT managers had been asked about potential use of their idle capacity and were fully aware of these prospects—indeed, they precipitated the institution of the vertically permeable structure. Thus, in reality, organizational redesign was successful because it managed to effectively blend the messy, bottom-up process with the rationalized, top-down redesign initiative.

⁵During the time in which the new rules were created, frictions and divergent opinions inevitably arose. To deal with them, and to ensure both that the solution was appropriate, and that management would buy in the new structure, the change management process was carefully managed. For instance, Fashion Inc. used “referee workshops” to settle conflicts, resolve open issues, and ease interdepartmental friction. In the workshop, the different parties presented their arguments and a decision was then taken by top management (the “referee”), usually the CEO (cf. Williamson 1985, on dispute resolution by fiat).

⁶These advantages notwithstanding, permeability did impose some costs at the corporate level, as a result of the complexity it entails. Thus, corporate management vetoed some choices of individual units to become more permeable to make the firm more manageable. For instance, the “Cut” part of the CMT division was only allowed to use the in-house Fabric Unit for certain products, as opposed to engaging in full brokerage (i.e., having the total flexibility to use external sources of fabric in addition to captive ones). As an executive from the capacity planning division explained: “We need someone to oversee the entire value chain.”

⁷This process has some similarities with Bradach’s, who suggests that “four processes—modelling, ratcheting, socialization, and mutual learning—help a chain achieve its management objectives of uniformity and system-wide adaptation” (1997, p. 279). Yet, in our case, the firm does not primarily learn from the processes of other firms (“horizontal ratcheting”). Rather, it uses external inputs to overcome the “not-invented-here” syndrome. This difference underscores how the dynamics of managing vertical scope differs from the dynamics of franchising and asset ownership in one particular step of the value-adding process. For instance, while in Bradach’s (1997) case leveraging the knowledge of franchisors through “horizontal ratcheting” requires strong intellectual protection regimes and tight appropriability, in our case “vertical ratcheting” and the ability to develop competitive state-of-the-art products is made possible because of the relatively low appropriability regime.

References

Argyres, N. 1996. Evidence on the role of firm capabilities in vertical integration decisions. *Strategic Management J.* 17(2) 129–150.

- Arrow, K. J. 1975. Vertical integration and communication. *Bell J. Econom.* 6(1) 173–183.
- Baldwin, C. Y., K. B. Clark. 2000. *Design Rules: The Power of Modularity*. MIT Press, Cambridge, MA.
- Barzel, Y. 1981. Competitive tying arrangements: The case of medical insurance. *Econom. Inquiry* 19(4) 598–613.
- Billinger, S. 2005. Management hybrid vertikaler Integration. Unpublished doctoral dissertation, University of St. Gallen, St. Gallen, Switzerland.
- Billinger, S., M. G. Jacobides. 2006. Changing the firm’s digital backbone: How information technology shapes the boundaries of the firm. Working paper, London Business School/Leverhalme Trust Digital Transformations Programme, London, UK.
- Bradach, J. L. 1997. Using the plural form in the management of restaurant chains. *Admin. Sci. Quart.* 42(2) 276–303.
- Bradach, J. L., R. G. Eccles. 1989. Price, authority, and trust: From ideal types to plural forms. *Annual Rev. Sociology* 15 97–118.
- Burgelman, R. A. 1991. Intraorganizational ecology of strategy making and organizational adaptation: Theory and field research. *Organ. Sci.* 2(3) 239–262.
- Cacciatori, E., M. G. Jacobides. 2005. The dynamic limits of specialization: Vertical integration reconsidered. *Organ. Stud.* 26(12) 1851–1883.
- Camuffo, A., P. Romano, A. Vinelli. 2001. Back to the future: Benetton transforms its global network. *MIT Sloan Management Rev.* 43(1) 46–52.
- Chesbrough, H. W. 2003. *Open Innovation: The New Imperative for Creating and Profiting from Technology*. Harvard Business School Press, Boston, MA.
- Chesbrough, H. W., D. J. Teece. 1996. When is virtual virtuous? Organizing for innovation. *Harvard Bus. Rev.* 74(1) 65–73.
- Coase, R. H. 1937. The nature of the firm. *Economica* 4 386–405.
- Cohen, W. M., D. A. Levinthal. 1990. Absorptive capacity: A new perspective on learning and innovation. *Admin. Sci. Quart.* 35(1) 128–152.
- Conner, K. R., C. K. Prahalad. 1996. A resource-based theory of the firm: Knowledge versus opportunism. *Organ. Sci.* 7(5) 477–501.
- Daft, R. L., A. Lewin. 1990. Can organizational studies begin to break out of the normal science straitjacket? An editorial essay. *Organ. Sci.* 1(1) 1–9.
- DeutscheBank. 2002. H&M & Inditex—Focus on the figures (and not just the fashion). *Analyst Report* 1–110.
- Dutta, S., M. Bergen, J. B. Heide. 1995. Understanding dual distribution: The case of reps and house accounts. *J. Law, Econom. & Organ.* 11(1) 189–204.
- Dyer, J. H. 1996. Does governance matter? Keiretsu alliances and asset specificity as sources of Japanese competitive advantage. *Organ. Sci.* 7(6) 649–666.
- Eccles, R. G., H. C. White. 1988. Price and authority in inter-profit center transactions. *Amer. J. Sociology* 94 17–51.
- Firestone, W. A. 1993. Alternative arguments for generalizing from data as applied to qualitative research. *Educational Res.* 22(4) 16–23.
- Foss, N. J. 2003. Selective intervention and internal hybrids: Interpreting and learning from the rise and decline of the Oticon spaghetti organization. *Organ. Sci.* 14(3) 331–349.
- Gereffi, G. 1999. International trade and industrial upgrading in the apparel commodity chain. *J. Internat. Econom.* 48(1) 37–71.

- Ghemawat, P., J. L. Nueno. 2003. Zara: Fast fashion. Harvard Business School Case No. 9-703-497, Harvard Business School, Boston, MA, 1–35.
- Ghoshal, S., P. Moran. 1996. Bad for practice: A critique of the transaction cost theory. *Acad. Management Rev.* **21**(1) 13–47.
- Grant, R. M. 2005. *Contemporary Strategy Analysis*. Blackwell, Malden, MA.
- Grossman, S. J., O. D. Hart. 1986. The costs and benefits of ownership: A theory of vertical and lateral integration. *J. Political Econom.* **94**(4) 691–719.
- Grubert, H., J. Mutti. 1991. Taxes, tariffs, and transfer pricing in multinational corporate decision making. *Rev. Econom. Statist.* **73** 285–93.
- Gulati, R., P. R. Lawrence, P. Puranam. 2005. Adaptation in vertical relationships: Beyond incentive conflict. *Strategic Management J.* **26**(5) 415–441.
- Harrigan, K. R. 1985. *Strategic Flexibility a Management Guide for Changing Times*. Lexington Books, Lexington, MA.
- Hart, O. 1995. *Firms, Contracts, and Financial Structure*. Oxford University Press, Oxford, UK.
- Hayek, F. A. v. 1945. The use of knowledge in society. *Amer. Econom. Rev.* **35**(4) 519–530.
- Heide, J. B. 2003. Plural governance in industrial purchasing. *J. Marketing* **67**(4) 18–29.
- Jacobides, M. G. 2005. Industry change through vertical disintegration: How and why markets emerged in mortgage banking. *Acad. Management J.* **48**(3) 465–498.
- Jacobides, M. G. 2006. The architecture and design of organizational capabilities. *Indust. Corporate Change* **15**(1).
- Jacobides, M. G., L. M. Hitt. 2005. Losing sight of the forest for the trees? Productive capabilities and gains from trade as drivers of vertical scope. *Strategic Management J.* **26**(13) 1209–1227.
- Jacobides, M. G., S. G. Winter. 2005. The co-evolution of capabilities and transaction costs: Explaining the institutional structure of production. *Strategic Management J.* **26**(5) 395–413.
- Jacobides, M. G., S. G. Winter. 2006. Entrepreneurship and firm boundaries: The theory of A firm. *J. Management Stud.* Forthcoming.
- Kay, N. 2000. Searching for the firm: The role of decision in the economics of organizations. *Indust. Corporate Change* **9**(4) 683–707.
- Kogut, B., U. Zander. 1996. What firms do? Coordination, identity, and learning. *Organ. Sci.* **7**(5) 502–518.
- Langlois, R. N. 1992. Transaction-cost economics in real time. *Indust. Corporate Change* **1**(1) 99–127.
- Langlois, R. N. 2003. The vanishing hand: The changing dynamics of industrial capitalism. *Indust. Corporate Change* **12**(2) 351–385.
- Leiblein, M. J., D. J. Miller. 2003. An empirical examination of transaction- and firm-level influences on the vertical boundaries of the firm. *Strategic Management J.* **24**(9) 839–859.
- Lovas, B., S. Ghoshal. 2000. Strategy as guided evolution. *Strategic Management J.* **21**(9) 875–896.
- Miles, M. B., A. M. Huberman. 1994. *Qualitative Data Analysis*. Sage Publications, Thousand Oaks, CA.
- Parmigiani, A. 2004. Why do firms both make and buy? An investigation on concurrent sourcing. Working paper, University of Michigan Business School, Ann Arbor, MI.
- Powell, W. W. 1990. Neither market nor hierarchy: Network forms of organization. *Res. Organ. Behavior* **12** 295–336.
- Richardson, J. 1996. Vertical integration and rapid response in fashion apparel. *Organ. Sci.* **7**(4) 400–412.
- Sabel, C. F. 1994. Learning by monitoring: The institutions of economic development. *The Handbook of Economic Sociology*. Princeton University Press, Philadelphia, PA.
- Sanchez, R., J. T. Mahoney. 1996. Modularity, flexibility, and knowledge management in product and organization design. *Strategic Management J.* **17** 63–76.
- Santos, F. M., K. M. Eisenhardt. 2005. Organizational boundaries and theories of organization. *Organ. Sci.* **16**(5) 491–508.
- Schilling, M. A. 2000. Toward a general modular systems theory and its application to interfirm product modularity. *Acad. Management Rev.* **25**(2) 312–334.
- Shelanski, H. A., P. G. Klein. 1995. Empirical research in transaction cost economics: A review and assessment. *J. Law, Econom., & Organ.* **11**(2) 335–361.
- Silver, M. 1984. *Enterprise and the Scope of the Firm*. Martin Robertson, London, UK.
- Teece, D. J. 1986. Profiting from technological innovation: Implications for integration, collaboration, licensing and public policy. *Res. Policy* **15** 285–305.
- Thompson, J. D. 1967. *Organizations in Action*. McGraw-Hill, New York.
- Williamson, O. E. 1985. *The Economic Institutions of Capitalism: Firms, Markets, Relative Contracting*. The Free Press, New York.
- Williamson, O. E. 1991. Strategizing, economizing, and economic organization. *Strategic Management J.* **12**(8) 75–94.
- Williamson, O. E. 1996. The analysis of discrete structural alternatives. *Admin. Sci. Quart.* **36**(2) 269–296.
- Williamson, O. E. 1999. Strategy research: Governance and competence perspectives. *Strategic Management J.* **20**(12) 1087–1108.
- Yin, R. K. 1994. *Case Study Research: Design and Methods*. Sage Publications, Thousand Oaks, CA.
- Zenger, T. R., W. S. Hesterly. 1997. The disaggregation of corporations: Selective intervention, high-powered incentives, and molecular units. *Organ. Sci.* **8**(3) 209–234.