DESIGNING THE BOUNDARIES OF THE FIRM:
FROM “MAKE, BUY OR ALLY” TO THE DYNAMIC BENEFITS OF VERTICAL ARCHITECTURE

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Our inductive, longitudinal evidence of a major European apparel manufacturer suggests that over and above making individual “make, buy or ally” choices, firms use different “modes” of connecting to intermediate and final markets. They may make inputs, or buy them, or both; and they may transfer outputs downstream, or sell them, or both. This yields nine different, more or less “vertically permeable” modes, for each step of the value chain. The configuration of these more or less vertically permeable segments, held together by transfer prices and corporate incentives, characterizes a “vertical architecture” at the corporate level, which is our focus. Firms can adopt permeable vertical architectures (partly integrated, partly open to the market), without changing their aggregate scope. They do so in the expectation of some dynamic benefits at the level of the corporation: vertical permeability enables a more effective and efficient utilization of resources and capacities, a better matching of capabilities with market needs, and market-based benchmarking to improve corporate operational efficiency. Second, while partial integration enhances strategic capabilities by providing links between key parts in the value chain, partial use of the market exposes the firm to innovations developed outside its boundaries, providing the impetus for new products and processes. Third, increased transparency resulting from permeable architectures enables more effective resource allocation and dynamic growth. Thus, over and above ensuring transaction-level alignment, the appropriate design of firm boundaries and a judiciously chosen vertical architecture can transform a firm’s productive capabilities and strategic prospects.

(245 words)

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1 INTRODUCTION

Designing the boundaries of an organization, choosing what is “inside”, what is “outside”, and how the firm interfaces with the market, is a crucial aspect of organizational design. The case of Fashion Inc., a major European apparel manufacturer, illustrates the importance and the potential benefits of redesigning firm boundaries. Fashion Inc. completely re-designed its boundaries in response to increasing competition. This redesign effort, which took three years, was undertaken to help the company cope with the weaknesses of vertical integration and to strengthen its value chain. Early results seem to confirm its success. This study illustrates that the nature of the redesign, and the benefits it brought, cannot be fully captured using existing frameworks and tools. Fashion Inc., a “traditionally vertically integrated” firm, i.e. with an internal-focused value chain, gradually “opened up” its boundaries to intermediate markets. It did not simply exit from one part of the industry, or shift from “making” to “buying”, or “co-producing” inputs; rather, it instituted permeable vertical boundaries, and allowed many of its units to both make and buy, thus maintaining a partial presence along its value chain. Our detailed case-study shows that the re-design of Fashion Inc. led to different modes of vertical permeability in each part of the value chain; that is, the firm’s units interfaced with internal and external customers and suppliers in a variety of ways, opening themselves up to new intermediate markets. More importantly, it shows that the re-design of the firms’ boundaries, and the increased penetration of the market, which did not affect the firms’ vertical scope, was not primarily driven by “transactional alignment” in the individual parts of the value chain. Rather, it was based on the expectation of some systemic benefits at the level of the firm. It is on these firm-wide dynamic benefits that we focus in this paper.

Our study of Fashion Inc. thus complements, but also differs from the existing theory about vertical scope and firm boundaries in a number of ways. In our study we use different units of analysis. As a result of the micro-analytic focus of Transaction Cost Economics (TCE) (Coase, 1937; Williamson, 1985), the literature has focused mainly with the conditions that lead a firm to “make” rather than “buy”, or, as more recent research has pointed out, to “ally” (Dyer, 1996; Williamson, 1999). It has been concerned with the governance modes of particular transactions or organizations rather than actual boundaries. We argue that this emphasis on the transaction, useful and important as it is, neglects certain factors that operate at the level of the firm, and which may play a critical part in the logic underpinning a firm’s vertical scope, and affecting a firms’ productive capabilities, systemic adaptation, innovative potential, and performance.

Our analysis contextualizes the presumed contrast between the firm and the market. The predominance of the analysis of “discrete structural alternatives” -- that is, to make, buy, or ally -- is so deeply ingrained in our thinking about firms’ boundaries, that we often juxtapose the firm and the market or “the hybrid” (Foss, 2003; Williamson, 1996). However, this juxtaposition can be confusing. As Coase (1937) pointed out, every firm connects with the market in order to purchase inputs (raw materials and labour in the case of a fully integrated firm), and in order to sell the goods or services it produces. Thus, the real question is when and how does it do this? To answer this, we focus on the “topography” of how a firm links with
intermediate and final markets. We thus consider two nested levels of analysis: the single step in the value added process, most usually the Strategic Business Unit (SBU) level; and the corporation as a whole.

By focusing on a single step in the value chain, we provide a better insight into the structures that link firms and markets. We identify nine different modes of vertical permeability that apply at the SBU level where choices are made about input and output design. Each of these represents a different way that the parts of the value chain can be linked to final and intermediate markets, and to owned or outside suppliers. Our study also extends research that suggests that firms both make and buy the same inputs (see Dutta et al., 1995; Heide, 2003), suggesting new reasons for why this occurs. We find that rather than using “plural forms” or “mixed procurement” and engaging in some parts of the production to keep a check on the quality and costs of suppliers, or balance their power, firms also use the market to ensure that their own internal divisions are competitive, using intermediate markets to benchmark the strength of their value chain, thereby increasing transparency.

Finally, we consider the design of firm boundaries at the level of the entire corporation. We look at the overall structure of the value chain chosen by the firm at the level of enterprise design, which we term vertical architecture. In this context, vertical architecture includes (a) the choice of which parts of the value chain to be active in; (b) the mode of vertical permeability (how it interfaces with internal and external suppliers and buyers) at each stage; and (c) how vertical relations, including transfer pricing, inter-SBU resource allocation, and divisional incentivization, are managed at corporate level. We consider that examining overall vertical architecture reveals some important systemic properties of the firm that have not to date been studied explicitly. As Kay (2000: 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.

Most importantly perhaps, our research explicitly links the choices over vertical structure (at the corporate level or the level of an individual step of the value chain) to the nature of the firm’s capabilities. Rather than focusing on how firms may want to align themselves to their transactional environment, or how they can shield themselves from the uncertainties in demand by the appropriate choice of scope, we focus on how choices over structure affect a firm’s productive capabilities, systemic adaptation and innovation potential.

We therefore extend recent research into how capabilities and TC co-evolve (Cacciatori & Jacobides, 2005; Jacobides & Winter, 2005). We look particularly at how the choices made about vertical permeability and vertical architecture can create dynamic benefits at the corporate level in three distinct ways. First, vertical architecture and the degree of exposure to intermediate markets can foster more effective and efficient operations by enabling regular benchmarking of in-house operations against intermediate markets, and enabling the firm to improve the match between its capabilities and capacity utilization throughout the value chain. Second, we show that vertical architectures can yield dynamic
benefits through the development of strategic capabilities at corporate level. For instance, a “tapered” vertical integration was used by Fashion Inc. to provide support for systemic innovation and quality management / improvement processes along the value chain. On the other hand, the use of outside intermediate goods and services acted as an impetus for increased absorptive capacity (Cohen & Levinthal, 1990) and encouraged greater innovation through its more open structure (Chesbrough, 2003). Third, “permeable” vertical architectures enable resources to be channelled more appropriately within the organization, and facilitate uneven but effective growth in the value chain to respond to opportunities in intermediate and final markets, and avoid the weakest parts of the value chain becoming bottlenecks impeding the progress of the firm. Increased permeability allows identification of which parts of the firm are most effective, and where further investment should be directed (see Burgelman, 1991; Tushman & O'Reilly, 1997).

In the following section, we review the existing theoretical background. We then consider the data, methods used in our study and describe the firm and its context. We explain why Fashion Inc. re-designed its boundaries, and what this re-design consisted of. We show that the changes in Fashion Inc’s boundaries are not completely accounted for by existing research, and introduce a framework that identifies the nine different modes of vertical permeability possible at SBU level. We then examine more thoroughly what lay behind Fashion Inc’s re-design, and suggest that, in addition to benefits at SBU level, benefits accrued to the corporation as a whole. We thus move to the question of how corporations design their overall vertical architectures, and consider the dynamic benefits that can be obtained from an effective, possibly permeable, vertical architecture. In the conclusions, we look at the limitations of our approach, and relate it to existing theory. We argue that, in addition to the microanalysis of the make-buy-or ally choice, we should also consider the systemic dynamic benefits that accrue to firms as a result of an effective, possibly permeable vertical architecture, changing the focus, level of analysis, and mode of investigation.

2 Existing Theory

The question of firm boundaries, and in particular of vertical scope, was first raised by Coase (1937), who observed that in deciding on firm boundaries, entrepreneurs and managers weighed up the benefits of internal production against the costs and risks of using the market. The pioneering work of Williamson (1971; 1975) and Klein, Crawford & Alchian (1978) led to what we now know as TCE. The idea of vertical scope is central to TCE (Williamson, 1985), and the firm’s decision in relation to boundaries became synonymous with the decision to integrate a particular transaction within its own governance structure: the decision to make rather than buy. For instance, asset specificity would make a potential party to a market transaction exposed to post hoc opportunistic renegotiation. In order to safeguard valuable yet asset-specific investments, firms had no choice but to integrate, especially if uncertainty exacerbated the risks involved in renegotiation. Therefore, to understand a firm’s decisions in this respect, it is necessary to understand the determinants of asset-specificity. A huge body of empirical and
theoretical research has examined the main thesis of TCE, and broadly supports the link between asset-specificity, uncertainty and vertical integration (David & Han, 2004; Shelanski & Klein, 1995).

Various researchers have elaborated the TCE approach. The 1990s saw considerable debate over the interpretation of TCE findings and the type of advantage from internalizing production. Kogut and Zander (1996), for instance, suggested that firms are more than transactional havens; they are loci of identification, and provide the organizational backdrop against which knowledge and experience can be shared and applied, a theme amplified by Ghoshal and Moran (1996). Conner and Prahalad (1996) suggested that integrating not only saves on TC ("avoids the negatives"), but also helps to create value through better information flow and coordination, and concerted problem solving (Arrow, 1974; Nickerson & Zenger, 2001; Pelikan, 1969).

Over the last decade attention has shifted towards examining how the capabilities and idiosyncratic aspects of firms might affect their boundaries. Drawing on Richardson (1972), Penrose (1959), Barney (1984), and research in evolutionary economics (Nelson & Winter, 1982), several researchers have recognized that firms might be “islands of cooperation”, whose scope is path-dependent. It thus became accepted that the decision about whether to integrate or not may be related to the firm’s capabilities, and how to best profit from them (Chesbrough & Teece, 1996; Teece, 1986). Argyres (1996) found that the decision about whether to make or buy was based on both capabilities and TC, a finding replicated in large-scale studies by Combs and Ketchen (1999), Schilling and Steensmaa (2001), Leiblein and Miller (2003), and Jacobides and Hitt (2005). These studies suggest that in setting their boundaries, firms have to take account of their own particular conditions and circumstances (Madhok, 2002; Williamson, 1999).

Another set of arguments suggests that in addition to “making” or “buying”, firms have the option to forge alliances or participate in networks for the supply of inputs or outputs (Dyer, 1996; Powell, 1990). TCE theory encompasses all these ideas, terming them “hybrids”, which include “long-term contracts, franchising, joint ventures and the like” (Williamson, 1991).

Therefore, the focus in almost all of the literature has been on the management of the “discrete structural alternatives”, i.e. make, buy, or ally (Williamson, 1996), in terms of whether or not a firm should internalize a given transaction. Debate has been about why such internalization occurs, but because of TCE’s micro-analytic focus, the focus of analysis has been the transaction (Williamson, 1985: 1).

Although recent research has looked at the evolution of industry boundaries and the nature of intermediate markets and industry participants (Christensen et al., 2002; Jacobides, 2005; Jacobides & Winter, 2005), there has been little, if any research focusing on the evolution of the manifold boundaries of one or many firms over time. Thus, the questions that have been posed are: does internalization happen because of TC, based on the fear of post hoc expropriation (Klein et al., 1978; Williamson, 1985)? Does it happen because of the need to align ownership with incentives (Grossman & Hart, 1986; Hart & Moore, 1990; Hart & Tirole, 1990)? Does it happen because of the problems of measuring and monitoring in-house (Barzel, 1981)? Does it happen because of the inability to educate potential outside suppliers about the desired properties of what will be sourced in real time (Langlois, 1992; Silver, 1984)? Does it happen...
because it makes sense from a comparative advantage view (Hoetker, 2005; Jacobides & Hitt, 2005; Leiblein & Miller, 2003; Schilling & Steensma, 2001)? Does it happen because it allows firms to focus on their areas of strength and thus promotes differentiation (Argyres, 1996; Gulati et al., 2005; Jacobides, 2005; Jacobides & Winter, 2005)? Or does it happen because it facilitates interaction between adjoining parts in the value chain, by fostering knowledge sharing, identity and organizational integration (Conner & Prahalad, 1996; Foss, 1996; Ghoshal & Moran, 1996; Gulati et al., 2005; Kogut & Zander, 1996)? All these questions intersect the “make-or-buy” choice and the conditions that induce a single transaction to be internalized (and stay within the boundaries of one organization) or to be enacted either through the market or an alliance. However, the boundaries within a particular firm, and their systemic patterns, i.e. the logic underlying how individual transactional decisions are intertwined along a particular firm’s value chain, have received far less attention.

That being said, a small number of studies do contribute to our understanding of the patterns of choices that firms make with regard to their boundaries. In examining these patterns, the main topic addressed is why firms both make and buy the same input—that is, what persuades them to use a “mixed procurement” strategy. The existing research would suggest that firms should either make or buy. It has been proposed that “mixed procurement” is really a function of unobserved transactional heterogeneity, in that a firm might buy the more generic, more easily tradeable parts of its needs at any point in the value chain, making the rest inhouse (Parmigiani, 2004), an argument also made in the context of outsourcing (Macher, 2004). On the other hand Dutta et al. (1995), observed that increased exchange difficulties in the “representative form” (independent external distributors) leads to the addition of house accounts (direct internal distribution), to provide benchmarks to better assess the external representatives. Dutta et al. found that transactional concerns and information asymmetries may drive not only the choices, but also the patterns of transactional choices. Thus, in surveying retail distributors (i.e. vertical specialists used by manufacturers for some or all of their distribution activities), they found that the existence of lock ins and the difficulty of finding measures to assess performance, substantially increased the probability that firms would use both market-based and inhouse distributors. Dutta et al. confirm the relative importance of transactional features, although it does not examine whether any other factors influence the decision to use a plural form, i.e. a mix of in-house and outside procurement, or when and why a manufacturer chooses to use only outside distributors or a mix of inside and outside. Although Dutta et al. point to the importance of understanding the factors that determine the plural mode, surprisingly little research has addressed this area. Heide (2003) confirms Dutta et al.’s intuition regarding the agency explanation, and suggests that a small level of in-house production is used as a means to check on and, more importantly, provide incentives for distributors or suppliers.

Harrigan (1984) is the only source of broad demographic information about what firms do with their boundaries as opposed to what happens in terms of individual transactions. She found that the vast majority of her broad survey used “mixed modes”. Her interests lie in prescribing, and she suggests that firms can use tapered integration to increase bargaining power with suppliers and customers, a point
noted earlier by Porter (1980), and, even earlier, in the literature on the information economics of vertical mergers (Arrow, 1975). Harrigan suggests also that tapered integration allows the firm more flexibility without dangers of being entirely integrated – a theme seldom discussed in the academic literature, but referred to in strategic management textbooks (Grant, 2005). Harrigan’s emphasis is on matching environmental conditions (primarily demand uncertainty, industry maturity and bargaining power) to aggregate patterns of integration. The firms’ capabilities are taken as given, and path-dependency and contractual issues are virtually ignored. Strangely, her findings, i.e. that tapered integration is empirically prevalent, did not generate any follow-on research either in the field of strategy, or institutional economics and strategic organizational design. Tushman and O’Reilly (1997), while noting the importance of this topic, provide only a limited discussion of it in their seminal book on strategic organizational design (1997: 232-235).

Bradach and Eccles (1989), in their criticism of the sharp distinctions inherent in TCE, also flag the theoretical dilemma of “plural” or “mixed” modes, which they define as the “distinct organizational control mechanisms operating simultaneously for the same function by the same firm” (1989: 113). While they do not analyze why the mixed mode occurs or operates at the level of the firm, they do suggest that it is necessary to look beyond the transaction, and argue that not just “individual transactions but the dynamics of whole [corporate] structures” (1989: 116) should be examined.

Work that builds on this approach and explicitly considers the mechanisms underpinning “mixed modes”, is the study by Bradach (1997), which examines whether, within one part of the value-adding process, (in particular, in prepared food distribution) chains use both owned and franchised units. He suggests that the use of multiple forms “ratchets” performance standards and enhances learning. It also allows firms to transfer knowledge created by franchisors to in-house operations, and vice versa, and to compare their own operations with those franchised to other parties. Bradach considers the disadvantages from having separate administrative structures. His focus, however, is on establishing a formula for how the firm can best replicate its advantage in one part of the value chain (see Winter & Szulanski, 2001). As Bradach notes “units in a restaurant chain [whose operation he studies] need to be similar” (1997: 299). Bradach does not focus on the traditional aspect of vertical scope, i.e. how many steps in a production process the firm is active in. Rather, he considers, within a chosen segment, how a firm profits from superior know-how or resources (brands, products, processes). Bradach takes the “mixed mode” within the value chain as given, and considers the mechanisms that support it. In summing up his contribution, Bradach suggests that he identifies “four processes – modelling, ratcheting, socialization, and mutual learning – that help a chain achieve its management objectives of uniformity and system-wide adaptation” (1997: 279, emphasis added). In short, Bradach’s particular focus is on one element of a firms’ boundaries (use of franchising vs fully owned branches) that we do not consider here, and where the aspect of replication is central.

Summing up, we argue that while existing research has focused on the reasons why a firm wants to buy or make, the boundaries of the firm as the unit of analysis have received little attention, either at SBU or corporate level. While for those who have studied vertical scope, this statement may seem provocative, it
is intentionally so. We want to underline that research to date has examined whether and when a firm would make rather than buy, i.e. it has looked at the action - of making, or buying, or allying – and when to apply it, but has rather ignored actual firm boundaries and how they affect the value chain. To use a “grammatical metaphor”, research has focused on the verb, to “make”, “buy” or “ally”, as opposed to the “noun”, the “boundaries” of the firm. To understand the logic of the “noun”, we are likely to need to do more than add the individual make-or-buy-or-ally choices.¹

An explicit analysis of firm boundaries, and how the firm connects with markets also helps to explain why the plural mode –both making and buying– is so common, and points to other factors that affect the firm boundary design. Also, as Santos and Eisenhardt (2004: 32) note: “Research [on boundary design] needs to be more process oriented, uncovering the causal mechanisms shaping the formation of boundaries … This may allow us to move way from simple environmental contingencies to a more in-depth appreciation of the complex roles of boundaries”.

3 METHODS, DATA AND CONTEXT

Methods

This research is based on a case study of a major European manufacturer, which we refer to as Fashion Inc., that designs and manufactures men’s, women’s and children’s clothing. The company sells most of its production to independent retailers or department stores. In 2002, Fashion Inc. generated approximately €250 million in revenue and employed almost 4,000 people in Europe. One of the authors conducted a qualitative study over 32 months (Eisenhardt, 1989; Voss et al., 2002; Yin, 1994), which involving inductive inquiry and field study methods. This allowed direct observation of key parts of the corporation’s main redesign process. The setting was chosen on conceptual grounds rather than for its representativeness (Miles & Huberman, 1994: 27). The aim was to study and understand firm boundaries, and so the focus was on a firm planning a specific, large scale vertical redesign effort.

We used multiple sources of evidence: archival data, industry publications and manuals, company documentation, and, most importantly, we participated in 146 internal workshops, and interviewed more than 130 employees, ranging from production workers to the Chief Executive Officer (CEO), Chief Operating Officer (COO) and Chief Financial Officer (CFO). In pursuing the inductive case-based research (Pettigrew, 1990), although we had some theoretical constructs in mind, we did not impose them. We looked at how our detailed evidence might inform existing theory, and the nature of key constructs. Our interest was to understand (a) the nature of the firm’s boundaries; (b) how personnel of Fashion Inc. tackled the problem of designing their boundaries (i.e. how they chose what to make, what to buy, what to

¹ A potential source of confusion in the literature is the sometimes inconsistent use of the “verb” and the “noun”. The “boundary of the firm” has tended to become synonymous with the “make or buy or ally” choice, so that discussions of the boundaries of an individual firm have been confused with decisions about “making vs buying”. All firms that make, also buy some inputs. The “noun”, i.e. the “boundary” of the firm, should not be confused with the “verb”, the “choice” firms make. We believe that some of the confusion in discussions of “hybrids” may be due to semantics (see Foss, 2003).
transfer downstream, what to sell, or whether to ally); and (c) the rationale behind the firm boundaries that were set. We focused on what the firm does or does not do in-house, and why. We were prepared to be instructed by our data about both constructs and theory. Data gathering (or, more accurately, participant observation) and theory generation followed a cyclical process. As we identified constructs and began to create a theoretical framework, we returned to the data for clarification, which in turn led to further theory development through an iterative process (Eisenhardt, 1989; Yin, 1994). As our theory and conceptualizations developed, we shared them with the industry participants, and other researchers who had studied the company in terms of its operational structure.

Data

The involvement of the research team started in May, 2002 when the company had recognized that its vertical structure was problematic, and was considering changes. Fashion Inc. contacted the research institute of one of the authors to ask for some academic input in the implementation of its design at the operational level – that is, at the level of administrative practice and the related technological and operational / physical infrastructure. Thus, although involved in the redesign, we had no influence on material decisions and did not drive the process. We had no concerns about a “self-fulfilling prophecy” (Merton, 1948), and adhered to the methodology established for researchers who also participate in the development of organizational change (Miles & Huberman, 1994).

The study fell into three phases between May 2002 and July 2005. During the entire period, we were able to review internal documents, including the SBU’s business plans, and operational information on their structure and processes; employee surveys, and other relevant documentation. We also participated in the reengineering team's twice-monthly milestone workshops, which included senior management and were used to discuss the changes to Fashion Inc.’s boundaries. Table 1 summarizes the data sources used in the study, and provides a guide to how the different pieces of evidence were used. Of particular relevance was our participation in the 146 internal workshops that were initiated by top management with the objective of formulating and implementing the firm’s strategic repositioning and boundary changing plan. We were able to participate in most of the meetings that related specifically to changes to the firm’s boundaries. Thus, we had access to an unusually rich set of data, and experienced real time participation in the re-design of the firm’s boundaries.

The workshops, summarized in Table 2, were top management’s main forums for debate and decision about the changes to be made to Fashion Inc.’s vertical structure. All key employees (specialists from particular departments and employees with relevant experience) were directly involved in these workshops, and care was taken to ensure that there was a common understanding among management and employees of the problems and their solutions. During the period when changes were being implemented, actions were discussed with and signed-off by top management on a two weekly basis. This process allowed us a unique level of inter-subjective agreement about both the nature and drivers of firm boundaries. The workshops were minuted and outcomes reported in writing for the company archives –
the firm was keen to keep an accurate record of the change process. These records were reviewed by the workshop participants to ensure accuracy, and we accessed them to augment and confirm our own notes.

*Include Table 1, 2 & 3 about here*

In addition, we verified specific comments and findings with the relevant people in writing. We produced a series of progress reports summarizing current status, which were reviewed by the company, thus guaranteeing accurate understanding about the different stages in the firm’s change process. Any discrepancies were discussed and documentation revised accordingly. In the first phase of the research, from June 2002 to January 2003, we undertook an in-depth study of the industry, and looked at the specifics of Fashion Inc., analyzing firm-level documentation, archival material, structures, etc. We conducted a first round of 116 interviews with employees and management of Fashion Inc. in order to completely familiarize ourselves with the problems the firm was facing. Weekly meetings with the reengineering team and twice monthly meetings with senior management continued throughout the study period. We participated in 8 workshops, involving a total of 205 employees, which aimed at identifying the problems within the corporation that were the result of its (integrated) vertical structure. In the latter part of this phase, between October 2002 and mid-January 2003, we attended 14 strategy workshops involving a total of 75 employees, which were aimed at ensuring that the newly developed strategy and associated vertical structure could be effectively implemented. By the end of this first phase, we had a complete picture of the previous and the proposed boundaries of Fashion Inc., and an understanding of the problems caused by the structure of the existing boundaries, and the solutions that a vertical reorganization might offer.

In the second phase of the research, between February 2003 and early February 2004, we attended 65 workshops involving a total of 43 employees, in the course of which Fashion Inc. finalized the process redesign of its new vertical structure. We reviewed the documentation on the related information technology (IT) infrastructure and the specifications for the new firm layout. By the end of the second phase, we had a list of preliminary findings and frameworks, which we reported and presented to Fashion Inc.’s executives.

During the third phase of the project, between mid-February 2004 and July 2005, we confirmed and fine-tuned our theoretical perspective and collected the data necessary to support our theory. We maintained weekly contact with Fashion Inc. in order to follow the implementation of its changes. In addition, we held semi-structured discussions with the internal reengineering team and with top and middle management about detailed changes. We conducted a final round of 21 interviews (lasting between 75-180 minutes) with employees across the organization, including the owner, the CEO, the CFO, members of middle management, department specialists, and some former employees, to confirm, share and finalize our findings (see Table 3). We made written notes in the interviews, tape recording being considered too intrusive. In addition, we conducted a few interviews when revising this paper in 2005 to allow us to better respond to the reviewers’ questions and to fine-tune our framework.
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: Fibre & Fabric, CMT (Cut, Make & Trim), OBM (Original Brand-Name Manufacturing) and Retail (see Gereffi, (1999) for a discussion of this sector). While most firms nowadays opt for a dis-integrated model, focusing on their areas of competency, vertical integration is successfully pursued by a few companies, such as ZARA and Benetton (Camuffo et al., 2001; Ferdows et al., 2004; Ghemawat & Nueno, 2003). These firms are still involved in manufacturing (Fabric and CMT) as well as Retail, and derive competitive advantage from being flexible and fast while maintaining high quality, which allows them to continue to be integrated in high-cost areas such as Western Europe. Integration is particularly important in in the high-fashion industry, and facilitates the rapid response that is required to be competitive (Richardson, 1996). Also, end-to-end solutions, including being integrated with retail, increase knowledge about customer behaviour, which makes innovation in terms of design and manufacturing more effective. This is the strategy of firms such as ZARA (Ghemawat & Nueno, 2003) and provides the background to Fashion Inc.’s redesign.²

4 WHY DID FASHION INC. WANT TO RE-DESIGN ITS BOUNDARIES?

Fashion Inc. is a long-established apparel manufacturer with a well-established own brand. It was involved in all stages of the value chain except the production of fibre, which was sourced externally: it had its own fabric and CMT facilities, mostly in Eastern Europe, and its OBM activities were located at its Western Europe headquarters. However, direct involvement in retail to end customers occurred in only a few outlet stores and did not significantly contribute to the firm’s revenues: Fashion Inc. relied on sales to independent retailers and major department stores. The reliance on this type of distributor whose prominence was declining, along with rather weak own OBM and regionally focused branding, led in the late 1990s to a crisis in Fashion Inc.. It found itself unable to sell effectively (as the relative position of its retailers was dwindling) and even when it found shelf space for its products, it had to compete with other strong, branded products. In other words, downstream weaknesses in sales, marketing and distribution were producing financial losses that might lead to bankruptcy.

² Since the early years of the 20th century, the value chain in this very mature industry has been shifting first towards geographical dis-aggregation (with firms locating parts of their operations abroad) and then towards 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 co-exist (Richardson, 1996). The “traditional” structure of the early part of the 20th 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 (Gereffi, 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 towards specialization was encouraged by the success of large firms that pursued only branding and marketing (e.g. Levi Strauss). Thus, by the turn of the century, not only was production geographically specialized; a large part of it was also vertically focused.
Other competitive pressures put a further strain on Fashion Inc. In the early 1990s, it became clear that
CMT, being the most labour-intensive part of the value chain, must be relocated for the firm to remain
competitive. Fashion Inc. acquired several CMT production facilities in Eastern Europe and divested
itself of most facilities in Western Europe. This relieved the situation for several years. As a retired fabric
manufacturing unit worker said: “At the beginning, everything was fine and we thought that we would not
need to relocate the fabric production”. But relocation of CMT, while clearly important for Fashion Inc’s
success, was not sufficient. With increasing competition in the retail market, Fashion Inc. realized that
fabric production, too, must be relocated. By the end of 2000 (see Table 2), most production activities had
been relocated to Eastern Europe, but even by 2001 it was clear that these geographic relocations were
not enough. Like other firms, Fashion Inc. was obliged to look at changes in its value chain structure and
the control mechanisms it might have over parts of the value chain.

The downstream prospects were also not rosy. All mid-priced brands, including Fashion Inc.’s, were
under severe pressure (DeutscheBank, 2002). Fashion Inc.’s strategy for the growth of its own brand was
not sustainable. As marketing department manager pointed out, “increasing the market share of our own
brand would require a major investment in marketing – and it would still be very risky”. This also meant
that following the industry trend towards emphasizing OBM and reducing the focus on manufacturing,
i.e. outsourcing manufacturing, was a risk that the corporation did not want to take as it did not sit well
with its comparative strengths. The problem was that weaknesses and volatility in the downstream
segment (OBM) were hampering the Fabric and CMT segments, and negating Fashion Inc.’s advantage in
these areas.

Fashion Inc.’s management thus decided to analyse its entire value chain and reconsider its structure.
First, it concluded that conventional transactional risks driven by asset-specificity were not too
significant. It recognized that profit could be derived from all steps in the value chain and that closing
down or selling off its manufacturing facilities would jeopardize the relatively stable part of its business
and introduce uncertainties and volatility. A top manager from one production facility summarized it thus:
“Our business runs very well – why should we get rid of it?” The firm also recognized that the changing
boundaries within OBM could open up new business opportunities in the shape of services to enable other
apparel manufacturers to reposition themselves. As Fashion Inc.’s marketing manager put it: “Many
competitors outsource – why shouldn’t we help them?” Fashion Inc. felt confident that certain of its
capabilities could be of use to other companies that wanted to break up their own value chain, and that
Fashion Inc. could vertically co-specialize with firms involved increasingly in brand and design only.
Therefore, Fashion Inc. decided to maintain its vertical scope and improve its existing value chain.

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3 In the apparel industry, manufacturing technologies have been fairly stable in the last few years: 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 change in asset specificity in the sector,
which is confirmed both by interviews, and from studies of the sector (see Gereffi, 1999). An additional factor that
alleviates transactional concerns is the relatively small duration of contracts, and limited switching costs, which de
facto protects firms from ex post opportunistic renegotiation.
resources and capabilities. Dis-aggregating various steps in its value chain enabled Fashion Inc. to target new external business opportunities. It did not need to “invent” or create new intermediate markets (Jacobides, 2005); it could open itself up to those that existed. Fashion Inc. chose this approach after systematically assessing the new opportunities this would offer. By the end of 2001, a template had been developed for an evaluation of independent SBUs that would allow the opening of the boundaries. This was based on five questions:

- Is a latent or existing market accessible?
- Does the new business opportunity (business unit) reflect the corporation’s overall strategy?
- Does the new business opportunity generate an adequate return on investment (ROI)?
- Does the firm have the abilities and resources to address the specific market, or is it able to acquire them within a reasonable timeframe?
- Does the new business opportunity threaten existing business?

These five questions on “where to open up vis-à-vis the intermediate markets” helped to structure the decision-making process and to identify the markets to be addressed. The answers to the questions provided a blueprint for the redesign effort\(^4\) and the identification of three SBUs, which were established in early 2003:

- **The Fabric Unit** to offer its excess production capacities to outside customers thereby exploiting internal economies of scale, while offering small production lots to customers. Its objective was to maintain and gather market and sourcing knowledge on fibre and fabric. Its own production encompassed every manufacturing step involved in transforming fibre into dyed fabric.
- **The CMT Unit** to offer excess production capacity to external customers. Production included cutting, making, trimming and the logistics relating to apparel. The CMT Unit was able to capitalize on recent sourcing trends and its knowledge of upcoming apparel manufacturing regions and countries.
- **The Service Unit** to offer its design, sourcing, packaging and logistics capabilities to external customers. It built on the industry’s “outsourcing paradigm” by being a full-service provider for branded marketers that were willing to outsource. This allowed it to broaden its scope and address both low and high priced market segments. The Service Unit would provide services for the Fashion Inc. brand and maintain the sales force for its own branded products while also providing services to competitors – for instance, its design capabilities. The Service Unit established a subdivision, the Outlet Unit, to handle direct sales of Service Unit products, thus integrating forward into retail.

Top management saw the establishment of the three SBUs as a central element in Fashion Inc.’s corporate strategy. It involved substantial strategic change and a consequent realignment of the firm requiring a re-

\(^4\) The 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, not systematic 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, the process of organizational re-design was successful because it managed to blend effectively the messy, bottom-up process with the rationalized, top-down re-design initiative.
drawing of the company’s vertical structure. The rationale of this effort was summarized in a comment made by the CEO: “whenever we have an attractive opportunity along our value chain [whether drawing on our own units and capabilities or on anyone else’s], we need to seize the opportunity and make profit”.

In order to ensure proper implementation of the new strategy, within the new boundaries, Fashion Inc. initiated change throughout the entire firm. A reengineering team was established to address internal challenges and to implement the new corporate strategy, following established reengineering methods (Hammer, 2002; Hammer & Champy, 1993; Tanner et al., 1998): The team members, who were drawn from various departments in the firm, were occupied full time on this project. The team was supervised by the CEO who committed himself to actively supporting the redesign of the firm. During the first stages of redesign, the team identified and analyzed the existing operational processes (Tanner et al., 1998). The analysis involved day-to-day processes being mapped and reviewed, and a study of the employees involved. In total, over 205 employees as well as two researchers (one being one of the authors) participated in this analysis. Employees were asked to rank the problems and potential areas for improvement in order to identify, from their perspectives, the most relevant operational areas in the firm. The results of this analysis indicated that implementation of the new strategy and eventual vertical dis-aggregation would require a rich set of design actions: Changes to firm boundaries do require effort.

5 WHAT DID FASHION INC.’S BOUNDARY RE-DESIGN COMPRISE

Fashion Inc.’s actual re-design effort incorporated three major elements that came out of the company’s assessment of its existing operations. First, processes required complete redesign to accommodate modular interfaces between business units. These incorporated the standardization of information and routines between the business units, and modular design of products and services (c.f. Jacobides, 2005; Sanchez & Mahoney, 1996). Second, the new processes brought about a new organizational structure involving changed responsibilities. Third, the new structure, especially given the international operations of the firm, required a new mode of governance and legal as well as administrative structures.

An illustration of the type of process redesign that was necessary is exemplified by the system of order processing for “key accounts” (i.e. major orders from established customers) depicted in Figure 2 (left side). Before the redesign, key account orders for apparel were processed by the customer service department, which checked with product management and production planning to confirm the feasibility of filling specific orders. If there was no spare capacity, the order was passed to the key account manager who checked with logistics and the warehouse. If it was finally established that the order could not be filled, it was the responsibility of the key account manager to inform the customer. The system involved five different departments and substantial time and capacity costs. If replicated in the various SBUs, the overall complexity of the accumulated processes would become unmanageable. Another example showing why process re-design was necessary to support vertical permeability is the provision of an intermediate service. Frequently, Fashion Inc. was asked by other firms to subcontract “unused” manufacturing capacity in both the Fabric and CMT SBU’s. Before processes were redesigned, this
occurred in a limited and unsystematic way, and although such use of spare capacity would have been profitable, and would have increased the capacity usage and the capability of the firm, the processes to allow Fashion Inc. to routinely offer such intermediate services were not in place (see Figure 2, right side). Requests did not go through any standardized process, and did not allow managers to find a way of “interfacing” with the market. Even where it was felt the service could be offered, the related processes were highly location- or even manager-specific. Thus, in the absence of an organizational blueprint for a generic “intermediate goods” order process, permeability at intermediate points in the value chain could not be achieved.

After process redesign, procedures were rationalized and made sales to intermediate markets possible (depicted in Figure 4): In other words, these changes in the administrative processes enabled Fashion Inc.’s SBU’s to become more flexible and able to deal with its in-house units as well as with outside agents. The new processes allowed for standarized processing of customer orders and inquiries, whether generated internally or from another company. Every SBU had a customer service centre, which could provide final, or intermediate goods and services, or a combination of the two. The decision about whether to use in-house capacity or outside suppliers was devolved to the SBU and departmental levels. The process modularization that enabled de-centralization and permeability built on both generic and SBU-specific processes within the three core SBUs, as depicted in Figure 4, which was supported by the installation of a state-of-the-art IT system.

The next step in the re-design of the firm’s boundaries was organizational design. Once the process redesign effort had begun to take shape, organizational and job redesign was necessary involving new job descriptions and responsibilities, and oversight by specific managers of different parts of the production process aligned to the new requirements. The effort of reassigning responsibilities and areas of control, started shortly after the process design phase was initiated in February 2003. The first layout was completed by the end of 2003, and some fine-tuning has been ongoing.

The final change involved in the establishment of new boundaries in Fashion Inc. was the creation of a new set of legal entities – the new “legal modules” for the underlying business activities. In creating these new legal structures, top management had to balance three concerns. First, the new structure should, if possible, mirror the emerging independent “vertical modules”. Second, when appropriately managed, the potential tax and regulatory benefits resulting from the creation of legal entities for distinct parts of the production process could be substantial. Thirdly, union demands had to be taken account of, especially important in the context of Western Europe. However, while the existence of modularity in legal and governance terms was important, it was certainly not seen as critical compared to process or organizational modularity. Also, legal and ownership boundaries did not always sit well with the actual demarcation of business activities observed in practice. In this sense, the economists’ emphasis on governance or ownership appears to have been overshadowed by organizational issues.
Finally, even more important than the legal entities and the associated reporting was the creation of a dynamic set of rules that governed the relationships between vertically related units. The establishment of a profit and loss (P&L) structure for each SBU (and also within some of the SBU’s which had P&L responsibilities for particular departments or production facilities) revealed the need to explicate transfer prices. While some local differentiation did persist, Fashion Inc. implemented a “cost plus” model that would be able (and expected) to compete with market prices (see Eccles & White, 1988: 40). P&L structures, then, were an important trigger of vertical dis-aggregation.

All these changes required substantial investment. What about the pay-off? Initial indications are that the changes are working out. The firm’s revenues have increased (quite markedly) as has its profitability, and all this without external intervention (e.g., new technical advances) and despite the worsening conditions in the industry as a whole, which have led to several competitors facing bankruptcy. The changes to the company’s vertical structure have meant that SBUs have been able to utilize their resources and capacities to greater advantage. Although longer will be needed to establish whether the changes undertaken by this single-case study firm can be pronounced best-practice, there are some promising signs. The customer base of Fashion Inc. has broadened, as have its existing retail markets, cross-unit sales have increased, and a number of additional business opportunities have emerged.5

In addition to improving key performance indicators, the disaggregation of the business units significantly increased transparency within Fashion Inc. As the CFO pointed out: “If you can’t measure it, you can’t manage it”. He also suggested that without real comparison with the market, instituting a new information system would not be effective. He told us that previously, the value chain was considerably less transparent. The improved performance transparency allowed a distinct evaluation of ROI, and a better management of assets along the value chain, and he attributed a good part of the recent performance increases to changes in the vertical structure of Fashion Inc. Yet, we wondered, were these complicated arrangements only temporary solutions to a performance decrease? On the basis of our interviews, and our participation in the design process, there was nothing that led us to believe that these solutions were viewed as temporary fixes. Senior management, as well as the firm’s owner considered the redesign to be vital for the long-term success of the corporation. Managers believed that these solutions would serve for a long period of time and constituted a blueprint for the future. The benefits of the redesign are best summarized by the CEO: “with the old [vertically integrated] strategy, we would not be at the point we are today”.

5 For instance, an OBM firm that was a competitor of Fashion Inc., sought to purchase a specialty fabric from Fashion Inc.’s Fabric Unit. This firm later decided to use Fashion Inc.’s CMT Unit as well. Given the differences in positioning between the two firms, management stressed that there was little risk in selling to a competitor, and that the benefits derived from “strengthening” the OBM Unit through competition far outweighed any potential costs.
6 INCREASING “VERTICAL PERMEABILITY”: OPENING UP THE BOUNDARIES WITHOUT CHANGING SCOPE

It is clear that Fashion Inc. did not engage in a simple “make, buy, or ally” choice in relation to any part of its value chain. Fashion Inc. did dis-aggregate vertically, and did “open up” its boundaries, but rather than the company splitting up into discrete parts, or dropping a part of the production process, it became both a buyer from and a seller to intermediate markets in which it had not previously participated. As existing research does not equip us with the tools to characterize this new structure, we propose a new approach and taxonomy to map this new vertical design.

Fashion Inc. encompassed remarkable variety in terms of the nature of the different units, depending on whether they bought their inputs or made them in-house, or did both. We also observed considerable qualitative differences between the units that only transferred their outputs to Fashion Inc.’s downstream operations, and those that sold in an intermediate market. Therefore, we constructed a simple matrix that looked at two dimensions: providing output to internal vs. external customers, or to a mix of internal and external customers on the one hand; and the use of internal or external suppliers, or a mix of both, on the other. Figure 5 illustrates and the Appendix explains the nature of each of the resulting nine cells, which correspond to nine different modes of vertical permeability. As Figures 5 and 6 show, vertical permeability can be defined as a distinct choice of input and output design for a specific step in the value chain. The degree of vertical permeability describes the extent to which a business unit is “open” to and uses an intermediate market on both the supplier and the customer side. In Fashion Inc. seven of the possible nine modes of vertical permeability were in operation, and, even though they were not eventually adopted by any of Fashion Inc.’s units, the other two modes were considered during the re-design process.

The 3x3 matrix in Figure 5 suggests that we might want to distinguish between buyers and suppliers vis-à-vis being “vertically permeable”. The dynamics of managing internal vs. external buyers are fundamentally different from the dynamics of managing internal vs. external suppliers. The shift from internal to external buying, for instance, means that a unit would need to develop new sourcing capabilities, and engage in performance monitoring or new modes of inbound logistics support. The shift from internal to external selling, on the other hand, requires the creation of a whole new set of competencies in terms of marketing, being able to connect to outside buyers; dealing with their requests; and creating the infrastructure that allows the unit to handle external sales.

This 3x3 categorization also expands the usual analysis of vertical scope. A “traditional” value chain depiction focuses solely on the question of whether a firm undertakes one or all of the value-adding steps in an industry. However, our analysis suggests that there are additional options to making in-house, buying, or forming alliances. For instance, rather than only considering the option of “integration” (using internal suppliers and transferring to internal buyers), and contrasting it with “specialization” (using external suppliers and selling to external buyers), or “outsourcing” (using external suppliers and
transferring to internal buyers), some units in the firm were engaging in what we term “outstreaming” (using internal suppliers, and transferring downstream as well as selling to external buyers on the intermediate market), and “brokering” (using both internal and external suppliers; and transferring downstream as well as selling to external buyers). This yields a much richer set of choices than those discussed in the literature. While we cannot fully consider when each choice is appropriate given the scope of this paper, we do provide a brief exposition in the Appendix, to be expanded in future research.

Each of these nine modes, then, differs in its degree of vertical permeability. This newly defined construct of vertical permeability, which operates at the level of the stage in the value chain, or the SBU, provides a different interpretation of Fashion Inc.’s value chain, depicted in Figure 6: looking at the additional arrows at the top of Figure 6 which represent inputs bought from intermediate markets, and at the additional arrows at the bottom of Figure 6 which represent sales to intermediate markets, provides a more satisfactory explanation of how the scope of Fashion Inc. evolved vertically. As Figure 6 shows, Fashion Inc. maintained its vertical scope, evidenced by the fact that the breadth of vertical integration was unaffected. At the same time, a number of new suppliers and customers entered its value chain. Thus, its vertical permeability changed, but this did not affect its scope.

What is interesting is why firms want to increase their vertical permeability: mixed modes (i.e., both making and buying) have largely been viewed with suspicion by academics (Bradach & Eccles, 1989; Menard, 1996; Parmigiani, 2004). We first wondered whether the extensive permeability in the case of Fashion Inc. was simply an inaccurate observation. From a TCE vantage point, the making and buying could simply be the effect of aggregating the two different types of transactions: those involving co-specialized assets, and those that are generic, whereby the firm makes whatever has transactional risks, and buys whatever is less risky. This suggests that if the analysis were conducted at the product level, no mixed procurement would be evident. We investigated whether what appeared to be mixed procurement in Fashion Inc. might be merely the result of coarse measurement, which unduly aggregated heterogeneous items made and procured outside. 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. The same pattern also held for innovative products. The results did not significantly vary by product category, or any other procurement categorization that might be correlated with transactional attributes.

The fact that mainstream theory is ill-equipped to explain mixed procurement led us to consider alternative explanations, and we first looked at the benefits that might accrue from greater vertical permeability at the level of the SBU. Discussions in the field suggested that there are two primary drivers of increased permeability: first, effective utilization of resources and capacities; and second, effective leveraging of differentiated capabilities along the value chain.
Starting with resources and capacities, one of the benefits of using external suppliers in addition to internal production is that it counters cycles and swings in downstream demand (Asanuma, 1993; Nishiguchi, 1994), and that it allows to operate on an effective scale – a possibility that Williamson (1975) and Riordan and Williamson (1985: 369) consider, presuming transaction costs are very low (as may be the case in our setting). Likewise, by exploiting external customers, a firm can ensure that its upstream production is not subject to uneven downstream demand. This allows organizations to provide buffers against the risks of reduced internal demand, due to downstream shortcomings (Pfeffer, 1978; Thompson, 1967). For example, Fashion Inc. decided to cater for external customers in its Fabric Unit in order to cover unforeseen seasonal demand swings. This enabled it to use the market to smooth demand by aggregating its own downstream requirements with those of potential external buyers, thereby allowing it more effective use of facilities, resources and capacity, and enabling it to compensate for declining demand from the weakening downstream unit.

We also examined why a firm would manufacture a particular input and then sell it on the market, when its downstream unit was buying in a similar input from another manufacturer. For instance, why was Fashion Inc. selling its fabric and at the same time buying in substantial quantities of fabric from outside producers, as Figure 6 shows to be the case? That this allowed Fashion Inc. to better match the timing and capacity of upstream and downstream orders is only part of the answer. More importantly, this “double trade” allowed Fashion Inc. to match differentiated capabilities in the different parts of the value chain. For instance, the Fabric Unit had the capability and capacity to develop "functional fabric" (i.e. fabric mainly used for sportswear, which does not feel wet on the skin when the wearer perspires). The market positioning of Fashion Inc.’s own brand did not allow full utilization of this capability, so the Fabric Unit was able to successfully offer its R&D capabilities to outside firms. So mixed procurement was not explained by the firm’s desire to selectively integrate into riskier inputs, but rather by its desire to match capabilities and capacities (e.g. being upmarket in terms of manufacturing and midmarket in OBM).

Vertical permeability, then, is driven by the need to better match capacities and capabilities over and above transactional considerations. This finding is consistent with recent research on the drivers of vertical scope (Argyres, 1996; Hoetker, 2005; Jacobides & Hitt, 2005; Jacobides & Winter, 2005; Leiblein & Miller, 2003; Schilling & Steensma, 2001). It suggests that the problem with an integrated firm is that it is only as good as its “weakest link”; and that by introducing a permeable structure we can allow the company to grow more effectively.

7 Vertical Architecture: The Organizational and Strategic Logic of Firm Boundaries

Given the substantial effort needed to re-design the boundaries of the firm, what were the organization-wide benefits that could be expected? As our field research progressed, we realized that changes to the boundaries of the firm, and particularly the increased vertical permeability, had impacts that went substantially beyond increased capacity and resources or better matching of capabilities, and transcended
SBUs. From discussions with senior management it became clear that the boundary changes were seen as important for an entirely different set of reasons. As we gradually came to realize, the extent to which intermediate markets were used to supplement or substitute for integrated production processes in Fashion Inc. was an important element in its strategic organizational design, and also facilitated dynamic adjustment to the corporation. Vertical permeability was seen as a monitoring device (Sabel, 1994) and a means to redirect resources to the most promising areas in the corporation (Burgelman, 1991) thereby enabling some parts of the value chain to grow more quickly than others. In addition to SBU-level benefits, then, vertical structure at the level of the corporation, what we have termed “vertical architecture”, was used as a mechanism to improve the firm’s efficiency and effectiveness.6

Specifically, we define “vertical architecture” as a firm’s distinct configuration of modes of vertical permeability along its value chain. The vertical architecture thus determines (a) the choice of which parts of the value chain the firm is active in; (b) the mode of vertical permeability for each of these stages (that is, how it interfaces with internal and external suppliers and buyers); and (c) the corporate logic of managing vertical relations, including transfer pricing, inter-SBU resource allocation, and incentivization. Fashion Inc. changed its vertical architecture to effect a transformation in the way its employees worked, cooperated, and took responsibility and initiative within their own divisions. The vertical architecture and increased permeability were seen as the means to change the organization itself. Changes to firm boundaries were designed to affect the realm of production (Demsetz, 1988; Langlois & Foss, 1999). As the CEO said: “if you want the entire system [Fashion Inc.], including the SBUs with their processes, to function [without permanent external intervention from the top], you need to start with firm values”. He knew that this goal was very ambitious and “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].” The motivation for making changes to the vertical architecture thus went deeper than the mere “streamlining” of the production process and a matching of capacities and capabilities. The new vertical architecture was intended to change behaviours, and has been shown so far to have had a significant positive impact.

This new architecture, then, was designed to provide a three-fold set of dynamic benefits for the organization as a whole. First, it enabled efficient and effective operations through competitive benchmarking and monitoring along the value chain, capitalizing on the benefits of permeable vertical structures described above. Second, a vertical architecture allowed fostering of strategic capabilities and the propensity to innovate. It allowed company-wide opportunities to be better exploited, and critical capabilities throughout the value chain be nurtured, and supported the innovation process through a more

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6 Of course, we should not underestimate the fact that the change to a vertical architecture was an opportunity to “unfreeze” the organization (Tsoukas & Chia, 2002; Tushman & Romanelli, 1985), so some of the benefits were simply the result of the ability to shed some outdated and counterproductive practices, fine-tune operations and reinvigorate the corporate culture (Birkinshaw, 2000; Markides & Geroski, 2004).
open “structure”. Third, it allowed for better resource allocation and more effective steering of the growth process (Lovas & Ghoshal, 2000). It provided greater transparency and accountability and offered a blueprint for identifying where scarce capital could be put to the greatest effect (Burgelman, 1991). So, while choices in terms of scope were clearly related to the existing capabilities of the firm and transactional conditions, the company also employed the vertical architecture to obtain dynamic benefits. The way in which the vertical architecture can generate dynamic benefits, aided by vertical permeability, is summarized in Figure 7, which shows these benefits from the micro- to the macro-levels, going from left to right.

Include Figure 7 about here

The first set of benefits is the ability to help forge effective and efficient operations. On one side, effectiveness was supported through the use of vertical permeability, as described in the previous section. By opening itself partially to the market, Fashion Inc. was able to better utilize capacity and resources and was able to more effectively match its own upstream capabilities with complementary downstream capabilities of other potentially co-specialized firms. In addition, operational effectiveness was also based on the new generic processes (i.e. sourcing and order processing, depicted in Figure 4), which can be described as a portfolio of standardized interfaces (“docking stations”) that can be utilized very effectively to serve different settings along the value chain. On the other side, efficiency of in-house production was benchmarked against other non-captive firms. In addition, generic production functions, e.g. sourcing in the different business units, were benchmarked against each other, which enabled rapid identification, replication and improvement of best practice. The company used the greater permeability to ensure that it could improve its operations in many directions. For instance, obtaining prices for finished apparel made by other manufacturers is fairly straightforward: “Just go into the next store and you know them” said a manager in the marketing department. However, further upstream, transactions become “one-offs”, order details vary, the number of buyers and sellers drastically decreases, and reliable information is difficult to obtain. Furthermore, potential non-captive suppliers might be unwilling to provide this information. Fashion Inc. obtains prices from external suppliers on a regular basis. This is not done only to allow benchmarking: as the CFO stated “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.” The internal source must be competitive and if it does not meet the market price, the external supplier receives the order. Additionally, placing an order which it was not necessary to source from outside, can be seen as an investment in gathering information, and provided Fashion Inc. with the means to monitor and benchmark its own value chain against external performance. These findings parallel those of Bradach (1997: 287-291), who found that the combination of franchisees and employees allows for a process of “ratcheting”, which dynamically promotes efficiency; the difference in our setting was that firms did not engage in a battle between owned vs franchised identical “copies” of the same chain units; rather, they relied on information generated through the market to gauge the efficiency and effectiveness of the unit (Hayek, 1945).
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 (see Eisenhardt & Martin, 2000; Helfat & Eisenhardt, 2004; Jacobides & Winter, 2005 for a discussion; Martin & Eisenhardt, 2003). For example, Fashion Inc. decided that its competencies in fabric R&D were strategic and needed to be leveraged at the corporate level. However, although fabric R&D is part of the Fabric Unit, it relies heavily on knowledge about trends and demand that can most easily be obtained from the downstream, retail-facing Service Unit. Thus, to improve fabric R&D competencies, the vertical architecture needed to include *some* link between the Fabric Unit’s R&D and the Service Unit’s sales. This did not need to be an exclusive link, but the importance of the downstream knowledge to innovation upstream had to be recognized. It might seem that the SBU between fabric (and its R&D) and retail of apparel, namely, the Service Unit, could have been dispensed with. But, as Richardson (1996) rightly emphasizes in relation to the textile sector, integration is needed for rapid response (which is also why firms such as ZARA are so vertically integrated). Thus, *some* (but not full) integration is needed along the value chain not only between the Service and Fabric units (to facilitate information flow and calibrate innovative designs), but also in CMT, in order to inform design and fabric-based innovation for the part of Fashion Inc. ‘s collection that requires rapid response to customer needs. To increase capabilities at the corporate level, and to maintain another firm-wide capabilities, i.e. great flexibility and speed along the value chain, *some* integration between different units is desirable to support systemic adaptation. Another level at which important corporate capabilities can be developed is quality management. Fashion Inc. uses its vertical scope to define corporate standards for process and product quality with which every SBU must comply. Fashion Inc. ensures quality control, but it also allows for a superior mode of *improving quality control* over time, using vertically adjacent divisions to foster these improvements. Thus, vertical permeability supports the development of key strategic capabilities at the company level (Chesbrough & Teece, 1996; Teece, 1986).

Yet, while partial integration was used to ensure strategic capabilities were developed, partial use of the market was seen as facilitating the innovation process, and increasing the “absorptive capacity” of Fashion Inc. (Cohen and Levinthal 1990). Specifically, Fashion Inc.’s executives would encourage the purchase of innovative materials and services not only because they would be necessary inputs for downstream uses (e.g. fabric that would be used by the CMT and Service Units and that was not available in-house), but also because it would provide the impetus for Fashion Inc. to emulate these new and innovative products or processes. For instance, should a project manager of the Service Unit identify a new fabric, she would initiate the buying of this fabric to use it for her own purposes in the Service Unit, but would also be in touch with the Fabric Unit, inquiring about the possibility of Fashion Inc.’s developing a competitive fabric. The experience of Fashion Inc. in manufacturing, and information about how well the fabric sells, and which features are desirable, would then be fed back to the Fabric Unit, which, armed with this information, as well as with a more “hands-on” knowledge of the new fabric, would be able to come up with new features or designs, and possibly even come up with a more
innovative product. A manager of a fabric manufacturing facility recalls (Fashion Inc. acquired this facility a couple of years ago): “[As part of Fashion Inc.], we are now closer to the market … and get trend-news more quickly!” Thus, vertical permeability was used to promote and further enhance a more “open innovation” platform (Chesbrough, 2003).

While the balance between integration and permeability was designed to support the dual goals of systemic adaptation and open innovation, this structure, only partly open to the market, had additional macro-level benefits for Fashion Inc. Thus, the third type of benefit that the vertical architecture brought was greater transparency, which was a superior tool for resource allocation and dynamic growth.

Capacity, and the extent to which divisions could fill it, was used to gauge where resources should be directed. Rather than relying on subjective or pro forma assessments about which division needed more investment, or which division should be investigated for potential management changes, a division’s effectiveness in covering its capacity profitably guided the corporation’s evolution. So divisions that were not competitive (either in terms of "selling" within the firm or to competitors) were left to gradually decline while divisions that were efficient received more funding and greater capital investment. This mechanism for resource allocation was, in turn, intricately related to vertical permeability. Without the option of either buying from outside or selling outside, divisions could unwittingly be being penalized by the others’ performance. However, within the vertically permeable structure, an upstream unit could sell to an outside OBM should the in-house downstream OBM unit prove less able to compete. Similarly, an upstream unit could not blame poor performance on the weaknesses of downstream units, and vice-versa. Thus, the relative strengths and weaknesses of divisions become more visible and the mechanism of resource allocation or even of managerial evaluation were more robust.

Therefore, there is, at the corporate level, a logic that transcends and is not reducible to the choices made by each specific SBU. Yet to understand that logic, we need to consider some additional attributes of a vertical architecture, i.e., the transfer pricing mechanism, as discussed by Eccles and White (1988), and how managers are incentivized to interact with each other and with the market.

In terms of transfer pricing, Fashion Inc. allows units to set their own prices, and sell either directly downstream, or to outside parties. At the same time though, the bonus of divisional managers is not primarily related to the SBU level, so that transfer pricing and cost accounting do not become highly contentious issues. To attenuate potential conflicts in transfer pricing, 50% of each manager’s bonus directly reflects individual performance, and 50% is based on overall company performance as opposed to

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7 This process has some similarities with Bradach’s (1997) analysis of “ratcheting”. Baradach suggests that the use of both owned and franchised operators in the distribution part of the value chain allows for internal competition in terms of how to best manage some tasks, and that the use of franchisors yields new knowledge that the firm could not have generated by itself (“horizontal ratcheting”). In our case, the firm not only learns from the processes of other firms; it also uses the external inputs to bring in new ideas, and ensure that it can overcome the “Not-Invented-Here” syndrome. Interestingly, while in Bardach’s case, the use of the knowledge of franchisors is made possible through extremely strong intellectual protection regimes and tight appropriability, in our case this “vertical ratcheting”, and the emulation of others’ innovations is made possible because of the relatively low appropriability regime, which allows a good idea to be quickly adopted and improved.
being based primarily on divisional performance. Thus, as a senior manager explained, “we ensure that nobody is optimizing their own unit without considering the corporation”. This suggests that the use of the market for gaining critical benchmarking information did not need to also be associated with equally strong incentives – that is, managers did not fully internalize the relative advantages of their efficiency, when compared with the market. Their “bonus” was that an effective SBU could grow and receive resources, and along with more resources, more power for the executives involved; and that effective managers would receive personal recognition in their performance evaluations. But these incentives are much weaker than those described by Eccles and White (1988) in their analysis of transfer pricing and of the inter-divisional conflict it can create. Thus, vertical dis-aggregation and partial use of the market was Fashion Inc.’s tool to promote efficiency and effectiveness, and capitalize on market-generated information (Hayek, 1945) without truly “mimicking the market” (Foss, 2003).

This subtle but theoretically important point suggests that the market can be used to “infuse the firm” with information, without a drastic change in compensation (cf. Foss, 2003; Zenger & Hesterly, 1997). Rather than engaging in “selective intervention” (Williamson, 1985; Zenger & Hesterly, 1997), Fashion Inc. engaged in “selective information infusion”, which was meant to create good performance targets for its divisions, and guide the allocation of effort and resources. As a result of better means to incent and reward, Fashion inc also increased the percentage of managerial pay that was performance contingent; from 2003 onwards, it rolled out a new bonus plan, based on the measures described above.

Potential exposure to market pressure, was of course, not welcomed by all. Middle managers in previously sheltered segments were inclined to complain, but senior management were adamant about the importance of these new criteria for ensuring accurate information and transparency. While acknowledging the difficulties being encountered by some newly established SBUs, such as the Outlet Unit, the CEO pointed out that: “At the end of the day, they need to make money like all the other business units”. The new architecture was designed to change the structure, and the efficiency and the effectiveness of the business units, even if it occasionally caused some (justifiable) concerns at the local level. Table 4 provides more detail and evidence on how the vertical architecture worked in our setting, focusing on the key challenges it faced.

Include Table 4 about here

Yet while the permeable structure in Fashion Inc. did seem to bring a number of advantages, several potential issues should be noted. First, vertical permeability entailed a high complexity for top

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8 In terms of the measurement and reward systems, our findings support Milgrom and Roberts’ (1988) discussions of the multi-tasking problem, where they observe that if a managerial task has multiple objectives and only one is measured and rewarded, then value may be dissipated. We also confirm Jacobides and Croson’s (2001) caveat about using all the information there exists in an agency relationship, as being overly simple: reward criteria can be and often are corrupted. Consistent with their theoretical claim, we found that mixed incentives can allow disaggregated corporations to prevent business units from optimizing performance that would disadvantage the firm as a whole. On the other hand, our results challenge Sharma and Sarel (1995) who found that mixed incentives (incentives based on a combination of sales volume and customer satisfaction) reduce the customer service response of salespeople.
management (see Table 4). Second, permeability worked in our context, where selling a potentially valuable intermediate good (e.g. fabric, or CMT services) to a downstream competitor was not strategically detrimental; the management considered that if its own units could not pay the (shadow) price of a valuable intermediate input and the competition could, then it would be unduly subsidizing its own downstream units and distorting resource usage if it were to transfer downstream. That is, there was no perceived non-pecuniary benefit from subsidizing downstream units in this particular setting. Third, vertical permeability facilitated open innovation precisely because of the low appropriability conditions, which allowed Fashion Inc. to emulate the promising trends it saw in services and goods it bought from elsewhere. Fourth, vertical permeability required a substantial set of overheads; being able to both contract outside and work with an inside unit requires the development of a set of non-trivial “interface capabilities”. Building flexibility comes at substantial cost, including the IT and ERP system overhead in addition to the administrative restructuring required.

Potential caveats and limitations aside, the evidence suggests that a vertical architecture, i.e. a distinct configuration of modes of vertical permeability along a firm’s value chain, and the way it integrates with resource allocation and individual and SBU incentives, goes well beyond the “make, buy or ally” choice. As Figure 7 illustrates, the choice of a permeable vertical architecture improves transparency and enables better monitoring, and thus leads to greater efficiency and improved corporate culture, as well as enabling more effective operations through vertical permeability. A permeable vertical architecture also affects capital allocation and top management intervention. Finally, it can support the strategic objectives of the firm and facilitate innovation and the development of strategic capabilities along the value chain. Thus, not only does a vertical architecture emerge on the basis of the existing resources, capabilities, and transactional conditions of a firm, it also has the ability to change these very conditions, dynamically shaping the future of the firm.

8 DISCUSSION

For about three years, we studied an organization that had made the decision to change its vertically integrated structure; it achieved this, and its efficiency and profitability increased as a result. However, the way in which the firm changed, and the nature of the benefits it received were not entirely aligned with existing research. First, we observed in the case of Fashion Inc. that when a firm decides to change its boundaries, it does not necessarily drop one part of its value chain to become more vertically specialized. Rather, it may simply “open itself up” to intermediate markets, thus increasing its vertical permeability. Our study offers more explanatory detail about how firms choose and change their boundaries through the identification of the different modes of permeability illustrated in Figure 5. This approach differs from and also complements the rich TCE tradition by identifying the factors that are not reducible to the choices made by firms “on the margin”.

While our research merely points to the possibility that firms might want to “open up”, possibly using both market and in-house operations, there are good reasons to consider the nature of vertical
permeability and the dynamics of plural forms more broadly: Harrigan’s (1984; 1985; 1986) and Dutta et al.’s (1995) research, complemented more recently by Bradach (1997), Heide (2003), Nygaard (2003), and Parmigiani (2004) suggest that such forms are likely to be more than just transient, dis-equilibriated, anomalous entities; rather, they appear to be empirically significant. Our research has identified the nature and rationale of these forms. Yet their empirical prominence, and detailed examination of when each is appropriate are two important extensions left for future research.

Our research sheds light both on the “topography”, and the rationale of these plural forms, building on inductive case study research methods that produce a fresh set of insights. But it also tries to impose some more structure on their examination. By shifting our focus from the level of the transaction to the “step of the value chain” or SBU, we identified nine qualitatively different modes of vertical permeability, within which the “make-or-buy” choice is nested. Yet our focus was not on providing a comprehensive list of contingencies when each of the nine modes should be chosen; this was left for future research. Rather, we considered how more or less permeable SBU’s are “bound together” through the vertical architecture, which also defines the transfer price system, divisional incentives, and ways in which a firm leverages its vertical scope. We then probed the dynamic benefits of the vertical architecture, which operates at the level of the enterprise. We also document how choices in terms of vertical permeability and scope are intertwined with transfer pricing and organizational incentives to define vertical architecture, which emerges as a key challenge in enterprise design (Nadler & Tushman, 1997: 232).

Specifically, in our analysis of how the design of firm boundaries shapes organizations, we argue that opening up the boundaries of the firm through a permeable architecture does not need to be associated with the stronger and potentially destructive incentives that the theory considers to be inevitable when opening up to the market (Foss, 2003; Zenger & Hesterly, 1997), leading, e.g., to reduced intra-firm collaboration. Rather, we argue that the careful design of incentive structures and transfer pricing can allow firms to capitalize on most of the informational benefits associated with the use of the market (Hayek, 1945) without necessarily accepting the drawbacks and conflicts it creates, or the appropriation of rents that could otherwise accrue to the firm (see Table 4).

This approach raises a fresh set of issues that provide complementary explanations about when and why firms decide to open up their boundaries. For instance, rather than suggesting that “plural forms may be a strategy for ‘managing’ markets”, as they reduce the information asymmetries between buyers and sellers (Heide, 2003: 26), we argue that markets can also be used as a strategy to manage firms, by reducing the information asymmetry between managers and employees; by providing independent benchmarks; and by guiding the process of resource allocation and helping a firm capitalize on and develop its capabilities.

More broadly, by identifying the specific benefits associated with a vertical architecture, we shift the emphasis from the traditional comparative static analysis of transaction costs and existing capabilities, to dynamic benefits. Rather than focusing on how firms align their boundaries to suit environmental constraints and transactional limitations, we suggest that by appropriately designing their boundaries
firms can change and improve their own operations, productive capabilities, innovation potential, and resource allocation processes. We highlight the ability of a vertical architecture to affect the operational effectiveness and efficiency of its units; to help foster strategic capabilities and innovation; and to shape the growth and resource allocation process. Our analysis, then, provides a substantially different view of scope, which considers boundary re-design as a potential tool to improve organizations. Our evidence raises the possibility that other firms might benefit from emulating the logic or design principles we observed in Fashion Inc, summarized in Figure 7.

Thus, our paper provides a concrete framework to study the dynamic evolution of firm capabilities and firm structure (Helfat & Eisenhardt, 2004; Helfat & Raubitschek, 2000; Jacobides & Winter, 2005), focusing on the role that firm boundaries can play in a dynamic setting. This extends current research on the co-evolutionary dynamics of capabilities and firm boundaries (Cacciatori & Jacobides, 2005; Jacobides & Winter, 2005), as well as recent research on “open innovation” (Chesbrough, 2003).

Our findings are also relevant to modularity research (Baldwin & Clark, 2000; Sanchez, 2004; Schilling, 2000). Our research complements these studies by providing a grounded, empirical discussion on how a production process can be divided, i.e. “modularized” into different parts. Specifically, we provide a grounded view of vertical modularity and suggest that being integrated, in the sense of owning all the subsequent steps of the production process, does not preclude modularization. We also highlight the role of modularizing processes as a precondition for increasing vertical permeability, and provide an empirical context for the “encapsulation” and the generation of vertical modules. More empirical research of this sort will extend recent work on the nature of vertical modules (Baldwin & Clark, 2000), and explain how modularizing and dis-aggregating within the firm compares with the processes of dis-integration at the industry level (Jacobides, 2005). Also, our findings suggest that it may be empirically risky to speak as Langlois (2003) does of firms as “islands of modularity”. Firms themselves may have more or less modular structures, and exhibit different types of modularity along the value chain.

Our approach also clearly distinguishes between the issue of the individual “make, buy or ally” choice, and the question of how and why firms set their boundaries. By focusing on both the SBU and the corporate level, it suggests that the design of a firms’ boundaries is also driven by factors that are not reducible to the individual transaction, and that are driven by the firms’ desire to improve its capabilities. Furthermore, this analysis could help bypass some of the confusing, often inconsistent discussion of “hybrids”, and suggests that in addition to understanding the micro-analytical factors behind an individual choice of making or buying, we need to understand the architectural logic behind a firms’ boundaries. That is, rather than focusing on the “verb” of making or buying, we may also want to consider what is the logic behind the structure of the “noun”, i.e. the firm boundaries as an entity to be studied directly.

Bluntly put, much as the analysis of the micro-analytics of individual make-or-buy choice has helped advance our knowledge, we may have reached the area of diminishing returns for this mode of inquiry. On the other hand, our understanding of the systemic role of boundary design is in its infancy. We hope
that this study will generate follow-on research on when each structure, permeable or not, can be useful or destructive for the organization employing it, and will shift attention to the architectural principles of organizations and the systemic role of internal and external firm boundaries.

Limitations

These theoretical implications aside, this paper has several limitations. First, we focus on the “traditional” concept of firm boundaries in the sense of steps of the value chain internalized by the firm versus being undertaken by other parties. Yet several other types of boundaries are relevant and important. Santos and Eisenhardt (2004), for instance, provide an edifying discussion on the boundaries of power, of competence, and of identity, and how the different sets of boundaries relate. Furthermore, even in the narrow sphere of vertical boundaries, we have skated over some interesting distinctions, by focusing on what a firm does, what it buys and what it sells; so we do not examine the separate issue of asset ownership (Hart, 1995), or the use of franchising as opposed to owned operations as a means to create revenue (Bradach, 1997) for each part of the value chain. Both these aspects provide a different measure of integration. While in our context changes occurred primarily in terms of the “traditional” concepts of vertical scope, as there was no franchising in Fashion Inc., the issue of asset ownership, of franchising vs owning and how these issues relate to “traditional” concepts of vertical scope, requires further research.

More important, our evidence does not afford us a comprehensive analysis of the relative merits of a highly permeable vs. an integrated structure vs. a set of entirely independent, co-specialized entities. Likewise, we did not focus on the trade-offs between the fixed costs of the redesign of a firms’ boundaries against the dynamic benefits that might accrue, neither did we discuss what makes vertically permeable structures possible in the first place, or explicate the conditions under which integrated but vertically permeable structures become problematic. While we can attest to the logic with which they were chosen and implemented, and to the apparent benefits or shortcomings on the basis of direct observation, and while the overall performance of the firm improved, it is too early to weigh the role played by individual modes, and of the vertical architecture overall.

We should also note the inherent limitations of our method, which does not readily lend itself to generalizations. We chose Fashion Inc. for reasons of appropriateness rather than representativeness (Miles & Huberman, 1994). As such, the extent to which we can use Fashion Inc. as a generalizable example remains unclear. A key limitation appears to be the fact that transaction costs and asset specificity are relatively low in this setting, and therefore mixed modes may only be sensible within these rather stringent conditions. Similarly, it may well prove to be the case that the risks in other settings of cannibalizing downstream sales (through providing competitors with upstream supplies) may outweigh the benefits of a more transparent and permeable architecture and that the “open-innovation” might only emerge under weak appropriability regimes. Yet that being said, our focus was on understanding the process (Mohr, 1982), and hope that “variance research” might complement our study in the future.
Furthermore, while vertically permeable structures appeared to be advantageous for Fashion Inc., their limitations or the special conditions that allow these forms to come about need further research. We have also provided only sketchy evidence on the role of transfer pricing and intra-organizational incentives, or divisional incentives, as these relate to and interact with vertical architecture. More in-depth study, along the lines of Eccles and White’s (1988) seminal work, would clearly be useful, but exceeds the scope of this paper whose aim is to introduce the concept of vertical architecture, rather than provide in-depth investigation of any of its constituent parts.

**Concluding Remarks**

The substantial impact of the change in vertical architecture on the success of Fashion Inc. in terms of its ability to change the way divisions, and the individuals within them, operate, calls for a more thorough understanding of vertical architectures and of the benefits from using intermediate markets. The ability of particular vertical architectures, through a judicious use of vertical permeability, to achieve dynamic benefits at the business unit and corporate levels, should be taken seriously. Casual empiricism suggests that several organizations are experimenting with similar models of vertical architecture, and with the institution of “markets” as a means to link different parts of the same organization, or bridge between the organization and its environment. As Starbuck recently noted, “influential management fads, such as reengineering or outsourcing [among others], have originated from managers or consultants, and the most respected organization theorists have ignored them” (Starbuck, 2003: 442). The analysis of vertical permeability and vertical architecture could provide a useful tool to better understand new organizational forms and their logic (Daft & Lewin, 1990; Lewin & Volberda, 1999).

Our study suggests that it is impossible to understand firms and their vertical boundaries without appreciating the manifold impacts of their vertical structure on their success and operations. To do so, we need to consider the firm as the level of analysis, both at the level of the SBU / value chain segment, and at the level of the corporation, and thus study the evolution of a firms’ boundaries over time. This can help us obtain insights and patterns which are not reducible to the analysis of make, buy or ally choices, and help us better appreciate the systemic impacts of boundary design, especially on productive capabilities, systemic adaptation, innovation potential and resource allocation, thus complementing the impressive body of research that we have acquired on the role of an individual transaction. We also need to complement the discussion about how firms align with their transactional environment by appropriately selecting their boundaries, with an examination of how a firms’ capabilities are themselves determined by the design of the SBU’s vertical permeability and a corporations’ vertical architecture.

This paper is a preliminary, inductive effort in that direction. We hope that the proposed mode of investigation will eventually complement the current micro-analytic focus, and, more important, that the analysis in this paper might be of use to practitioners in strategy, organizational design and development, and policy, to create more effective organizations.
REFERENCES


Appendix: The 3 x 3 Modes of Vertical Permeability, in Principle and in Fashion Inc.

Of the nine theoretically possible “vertical permeability” modes in our 3x3 matrix, depicted in Figure 5, seven are currently used in Fashion Inc., one was used in the past and one was discussed in terms of a potential acquisition. This appendix briefly reviews each of the cells depicted in our 3x3 matrix, explaining their attributes and indicating where we found an incidence of each in Fashion Inc.

**Vertical Integration** is the transfer of goods and services from one division to another within the firm. It happens where the steps in the value chain are very closely linked or require direct processing. After the “Make & Trim” phase (in the CMT Unit) for instance, the manufactured garment requires “Packaging”, before it goes to order processing and leaves the CMT Unit. No market exists between these two steps in the value chain and, thus, there is only an internal customer and supplier. One unit transfers its output to another, without structured exchange that could potentially cross the firm’s boundaries. This choice is the “easiest” of all, in the sense that the company does not need to establish interfaces with the markets, i.e. sourcing and order processing, and as such can use highly idiosyncratic ways to link different parts of the value chain. TCE would predict that vertical integration might set in if highly specific assets or transactional risks are involved. Although they might be significant in other settings they did not predominate in ours. In other settings, vertical integration might also emerge if the specification of needs (or the creation of interfaces to link with other business units) is hard to do with an outside party, i.e. if no intermediate market exists. Where the firm has balanced capabilities throughout the chain, vertical integration is sensible. Furthermore, as we think is the case in this setting, vertical integration may be chosen over out-streaming when there is no expectation that there is a “market” in terms of latent demand downstream.

**Out-streaming** happens when supply is captive, but customers are both internal and external. The “Cut” phase in the CMT Unit is an example, as this phase only uses input from its (own) Fabric Unit, whereas it sells inside and outside. Internal inputs reduce the complexity of overall capacity planning, and alleviate the pressures on the ERP system. Additionally, by eliminating the risks of hold-up, the use of only in-house inputs allows supplying units to be physically proximate, and as such to reduce logistic costs and time. In addition, in the presence of frictional or contractual transaction costs in the upstream segment, outstreaming becomes more attractive. More broadly, outstreaming is strategically advisable when the upstream is more competitive than the downstream segment, such that the upstream segment uses both in-house and outside demand to capitalize on its strengths. Also, when downstream demand is hard to predict and when maintaining slack for peak demand makes capacity available in the short run, selling outside in addition to transferring downstream becomes attractive. Likewise, when upstream supplies are strategically important, or are predictable; and when interfaces towards other downstream companies are easy to specify and use, i.e. little more involved than transferring to an owned downstream unit, outstreaming is likely to be used.

**Tapered Vertical Integration** occurs when both internal and external suppliers are employed, whereas the downstream transfer happens only to owned divisions. The Service Unit, in its “Make & Trim” stage, uses this mode. This enables it to work with high capacity utilization in the “Make & Trim” stage, and accommodate potentially significant demand swings downstream. The joint use of internal and external sources helps to allow for capacity peaks in “Cut”. Not only is this beneficial in terms of capacity use; it also helps to ensure that the internal sources (the providers of inputs) are competitive, since they can be directly compared to market-based procurement. Also, this mode requires the ability to interchanging between in-house and outside sourcing – to put it in theory terms, it requires a fairly standardized, interchangeable interface. It also is chosen when the unit’s capacity utilization is economically or strategically important e.g., because of the high cost of idle capacity.

**Upstream Vertical Specialization**, a somewhat atypical choice, occurs when the upstream sources used are all internal, and the customers are only external. Within Fashion Inc., this mode is used by the sales force of Fashion Inc.’s own brand in the Service Unit. The sales people are very closely associated with Fashion Inc.’s own brand and are very familiar with the customer base in retail. The sales force identifies itself with the brand and would be unlikely to be able to transfer this identification to another brand. At the same time, they only sell to non-Fashion Inc. retailers. Being part of the sales department means that they only interact with their specific market and can fully concentrate on branding and sales in that particular market segment. This happens when the firm has no downstream presence in a particular segment, possibly because it would not be effective downstream and as such has elected not to participate. To give an example, Fashion Inc. could not compete with the neighbourhood clothing retailers in Europe, as it has no capabilities in that segment of the retail market, neither could it replicate the advantages locally entrenched vertical specialists have built downstream.


Outsourcing is a mode that has been widely (perhaps overly) discussed in the literature and consists of using one or more external upstream suppliers and internal downstream users. (Fashion Inc. was considering this in the 1990s, but decided against it.) This happens when the firm does not have a competitive advantage upstream, and, more to the point, does not want to build a position upstream. The reason is that outsourcing is often hard to reverse, and as such undertaking it restricts the strategic option a firm has; it also eliminates a part of the value chain and the associated capabilities altogether, and this could impede systemic adaptation. Additionally, outsourcing implies that the firm either does not see or does not consider the opportunity for a potential partially permeable vertical architecture to build dynamic benefits throughout the chain.

Tapered Trading consists of using internal and external sources, but doing so only to serve external customers. In Fashion Inc., for instance, one subsidiary of the Service Unit does not design anything for Fashion Inc.’s own brand, but provides this service to external customers. It uses internal and external sources and enables the subsidiary to have a profile that is not directly associated with Fashion Inc. This mode is adopted when there is a customer that requires customized, non-generic processes to link the internal and the external steps of the value chain. For instance, there are solid “upmarket” capabilities in design, but the positioning of OBM retail does not allow them to be used. This mode can be of use in the presence of clearly differentiated capabilities, such as design of different brands. This mode comes close to an “independent start-up”, which draws both on the firm and outside to produce, but is directed to external customers, often operating with customized and hence costly interfaces, and operating outside the usual corporate procedures.

Partial Brokering occurs when all the inputs are sourced outside (which implies a lack of presence, and as such an imputed lack of competitive advantage or interest in the upstream segment) and where the outputs are either internally transferred or sold to the market. Fashion Inc. uses this mode for fibre, which is sourced from outside; but the textiles that result from the fibre are both transferred inside and sold outside. Fashion Inc. uses this mode because it was never involved (or thought it could be competitive) in fibre production. Its selling smaller batches of fibre (with concomitant logistic support) to outside entities is also predicated on the fact that, through consolidating fibre demand, it can give downstream, external customers (e.g. external knitters) better terms, while still retaining a margin. The objective is to use internal economies of scale and negotiate reduced prices with external suppliers as well as to keep prices competitive in internal transfers. This mode requires standardized downstream interfaces that can be exploited for in-house transfers as well as market-based selling, and the existence of a competitive upstream market.

Trading consists of pure “matching”; this occurs in segments where a firm is a real arbitrageur, and, by definition, a vertical specialist. Rather than being involved in several stages of the value chain, a unit (or firm) operates within a single stage of the value chain. In this sector, this mode is employed by specialists who negotiate manufacturing capacities with Asian manufacturers and sell portions of the capacity to private label firms in Europe or the USA. The underlying business model is based on the capability to consolidate private label demand and exploit economies of scale. “Jobbers” in the Italian system in the Prato textile model (Enright, 1995) also come within this category. Fashion Inc. did consider the acquisition of one of these traders, but decided against it, as they could not be integrated with the rest of the organization and support the corporation’s vertical architecture.

Brokering is the mode that utilizes all channels, in both the upstream and the downstream segments, i.e. employing internal and external suppliers as well as customers. The goal of brokering is to utilize external suppliers whenever beneficial while offering products and services to external customers. Fashion Inc. uses this mode for order processing in the Service Unit, which is done through Fashion Inc.’s centralized logistics centre. This mode enables a firm to be fully exposed to the market for both inputs and outputs, i.e. be both “forward and backward tapered” (Harrigan 1985, 1986). Brokering allows the unit to reap the benefits of partial integration, through the support of systemic adaptation, as it is active in multiple parts of the value chain, and enhances the introduction of new products and services through the more open structures, by using the market. Furthermore, the fact that there is competition up- and down-stream forces all units to be competitive. However, this mode has several costs. First, it requires the existence of interfaces at both the upstream and the downstream ends that are interchangeable be they internal or external trading partners. This not only requires sophisticated ERP and IT systems, as well as a careful administrative division of labour; it also substantially complicates corporate planning. During our observation, we saw headquarters veto the proposal of one unit to shift to “brokering”, on the grounds that it would make corporate planning unwieldy (see Table 4). In principle, this mode could be beneficial when there is a balance in the capabilities along the value chain (hence the presence throughout the chain), and also where there are swings in the capacity in different parts of the chain or when there could be benefits from open innovation (hence the use of the market).
Figure 1: The Apparel Value Chain

- **Fiber & Fabric**
  - Production of fiber and fabric
  - Packaging, logistics

- **Cut Make & Trim**
  - Cutting, making and trimming of apparel
  - Packaging, logistics

- **Original Brand Name Manuf.**
  - Design and product development
  - Branding and marketing
  - Packaging, logistics

- **Retail**
  - Marketing at the points of sale
  - Selling of products to the final customer
  - Packaging, logistics

Figure 2: Example for the order management process before redesign. **Left hand-side process:** regular apparel customers; **Right hand-side process:** customers asking for manufacturing capacities.
Figure 3: The generic order management process after process redesign; now applied in all SBUs

Customer Service

Check in the IT system: Is the order possible?

Yes

Negotiations with customer; identification of potential standard articles

Key Account Manager

No

Customer Service

Internal coordination; placement of an order

Customer Service

Order placement in the IT system

Double check loops are unnecessary

Figure 4: Fashion Inc.'s overall process framework
Figure 5: Vertical Permeability: Beyond Make-vs-Buy

<table>
<thead>
<tr>
<th>Outsourcing</th>
<th>Partial Brokering</th>
<th>Trading</th>
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<tbody>
<tr>
<td>Fashion Inc.</td>
<td>Fabric Unit</td>
<td>Fashion Inc.</td>
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<td>- non-existent -</td>
<td>Knitting (Fiber Sourcing)</td>
<td>- potential acquisition -</td>
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<td>Tapered Vertical Integration</td>
<td>Brokering</td>
<td>Tapered Trading</td>
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<tr>
<td>CMT Unit</td>
<td>Service Unit</td>
<td>Service Unit Subsidiary</td>
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<td>Make &amp; Trim</td>
<td>Order Processing</td>
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<td>Vertical Integration</td>
<td>Outstreaming</td>
<td>Upstream Vertical Specialization</td>
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<td>CMT Unit</td>
<td>CMT Unit</td>
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<tr>
<td>Packaging</td>
<td>Cut</td>
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<tr>
<td>Internal</td>
<td>Internal &amp; External</td>
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<td>Who is my supplier?</td>
<td>Whom do I sell to?</td>
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Figure 6: Fashion Inc.’s current Value Chain: Vertical Architecture and Vertical Permeability
Figure 7: The Overall Framework: Vertical Architecture and its impact on Organizations

**Vertical Architecture**
Overall Firm Scope, Nature of Vertical Permeability, links between vertically related Divisions

**Dynamic benefits of vertical architecture**

**Intra-organizational and strategic logic of firm boundaries**

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Micro-level</th>
<th>Macro-level</th>
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<tr>
<td><strong>Operations’ Efficiency and Effectiveness</strong></td>
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<td>Efficiency through benchmarking, monitoring and incentives</td>
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<td>Effectiveness through leveraging capacity and resources / matching differentiated capabilities</td>
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<td>Strategic Capabilities and Propensity to Innovate</td>
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<tr>
<td>Capability development through partial integration, done to support systemic adaptation</td>
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<td></td>
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<tr>
<td>Growth and Resource Allocation Dynamics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partial use of the market to foster open innovation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transparency improving divisional relations and incentive structures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>More effective capacity utilization as resources go to “true bottlenecks”</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 1: Sources of Evidence throughout the Project

|-------------------------------------------------|-----------------------------------|-------------------------------------|-----------------------------------|
| **Primary Sources of Data**                     | • 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 3; initial discussion and framing | • 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 3 | • 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 3  
• Semi-structured interviews to confirm theory-building, described in Table 3 |
| **Secondary Sources of Data**                   | • Historical studies of Fashion Inc.  
• Sector descriptions  
• Research papers with apparel focus  
• Analyst reports | • Sector descriptions  
• Press releases  
• IT-manuals  
• Company manuals | • Sector descriptions  
• Press releases  
• IT-manuals  
• Company manuals |
| **Company Events involved in**                  | • Workshops as described in Table 2  
• Firm-wide gatherings (1 presentation of the new collection, firm anniversary, 2 firm parties) | • Workshops as described in Table 2  
• Firm-wide gatherings (1 presentation of the new collection, 2 firm parties) | • Workshops, as described in Table 2  
• Firm-wide gatherings (1 presentation of the new collection, 1 firm party) |
Table 2: Workshops Involved in / Attended during the Project, per Objective

<table>
<thead>
<tr>
<th>Type of workshop - dates</th>
<th>Number of participants</th>
<th>Number of workshops</th>
<th>Main objective of workshops</th>
<th>Demographics of workshop participants</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>June 2002 to January 2003</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Weaknesses in the former processes in 2002</strong></td>
<td>205</td>
<td>8</td>
<td>- Identification of operational weaknesses, i.e. double-check loops</td>
<td>- Employees and middle management; including all key persons of operations</td>
</tr>
<tr>
<td>• Product development</td>
<td>40</td>
<td>1</td>
<td>- Identification of operational weaknesses, i.e. double-check loops</td>
<td>- 50% of which were more than 10 years with Fashion Inc.; 25% between 5 and 10 years; 25% less than 5 years</td>
</tr>
<tr>
<td>• Sourcing</td>
<td>15</td>
<td>1</td>
<td>- Brainstorming on possible improvements</td>
<td></td>
</tr>
<tr>
<td>• Order processing</td>
<td>40</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Customer Relationship Management</td>
<td>20</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Production (in 4 different countries)</td>
<td>90</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>October 2002 to January 2003</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Strategy</strong></td>
<td>75</td>
<td>14</td>
<td>- Translation of SBU-business plans into operations</td>
<td>- Top management</td>
</tr>
<tr>
<td>• Market Analysis (ECR &amp; PARTS)</td>
<td>10</td>
<td>2</td>
<td>- Strategic framing for process redesign</td>
<td>- Representatives of the reengineering team</td>
</tr>
<tr>
<td>• Processes (Process &amp; Portfolio)</td>
<td>10</td>
<td>2</td>
<td></td>
<td>- 30% of which were more than 5 years with Fashion Inc.</td>
</tr>
<tr>
<td>• Development (SEP, Evaluation, consol.)</td>
<td>10</td>
<td>3</td>
<td></td>
<td>- 70% of which were less than 5 years with Fashion Inc.</td>
</tr>
<tr>
<td>• Implementation (2 x BSC, Sourcing)</td>
<td>15</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Quality &amp; Review</td>
<td>15</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>January 2003 to December 2004</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Process Redesign and Implementation</strong></td>
<td>43</td>
<td>65</td>
<td>- Design and implementation of future processes with optimized interfaces</td>
<td>- Middle management and motivated key persons of operations</td>
</tr>
<tr>
<td>• Product development</td>
<td>20</td>
<td>25</td>
<td>- Identification of SBU-specific and generic processes</td>
<td>- 95% of which were at least 5 years with Fashion Inc.</td>
</tr>
<tr>
<td>• Sourcing</td>
<td>10</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Order processing</td>
<td>10</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Customer Relationship Management</td>
<td>3</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>October 2003 to February 2004</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Selection of IT platforms</strong></td>
<td>15</td>
<td>3</td>
<td>- Design of IT prototypes</td>
<td>- Middle management and motivated key persons of operations</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Selection of future IT</td>
<td>- 95% of which were at least 5 years with Fashion Inc.</td>
</tr>
<tr>
<td>Type of Evidence Used</td>
<td>Number of participants</td>
<td>Number of meetings</td>
<td>Main objective of meetings</td>
<td>Demographics of interviewed participants</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>------------------------</td>
<td>--------------------</td>
<td>-------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>June 2002 to December 2004</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Regular Milestone Meetings</strong></td>
<td>10</td>
<td>56</td>
<td>- Project management of the change project</td>
<td>30% more than 20 years with Fashion Inc.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Verification of research layout and tentative findings</td>
<td>40% more than 10 years</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- 30% more than 20 years with Fashion Inc.</td>
<td>30% less than 2 years</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- 40% more than 10 years</td>
<td></td>
</tr>
<tr>
<td><strong>Regular Project Meetings</strong></td>
<td>2-6 *</td>
<td>52</td>
<td>- Project management of the change project</td>
<td>2 less than 3 years</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Verification of tentative findings</td>
<td>3 between 10 and 20 years</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- 2 more than 35 years **</td>
<td></td>
</tr>
<tr>
<td><strong>February 2004 to July 2005</strong></td>
<td>21</td>
<td>21</td>
<td>- Develop an understanding for the setting &amp; the structure</td>
<td>20% more than 20 years with Fashion Inc.</td>
</tr>
<tr>
<td><strong>Interviews</strong></td>
<td></td>
<td></td>
<td>- Verification of findings</td>
<td>50% more than 10 years</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- 30% less than 2 years</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* number changed due to vacation, sickness, retirement, etc.
** one member of the team retired and was replaced by a new employee
Table 4: Vertical Architecture: Vignettes of Selected Challenges, and how Fashion Inc met them

**Vignette 1: Balancing Transfer Prices with Qualitative Information: Selective Intervention in Action**

The creation of units that allow for a more permeable structure and which allow the “market” to be used as a reference was not without its challenges. For instance, the way that sourcing departments weigh up internal and external sources can be sophisticated or even ambiguous as illustrated by an example from the Service Unit: the Service Unit's sourcing department buys several thousand articles of apparel every year and has a range of criteria. Besides price, exchange rates, product quality and delivery time, additional criteria are the available capacity and the need to ensure backup in case of emergencies (e.g. a typhoon in Asia which destroyed production facilities of external suppliers). As an employee from the sourcing department said: “you need good gut feelings in order to balance all these criteria!” Thus, in addition to freely set transfer prices, some occasional “selective intervention” did take place, which, however, did not appear to be seen as a problem from the executives we interviewed.

**Vignette 2: The Real-World Limits in Setting Managerially Effective Transfer Prices**

In setting transfer prices, some additional subtleties emerged. For instance, the external comparison principle requires Fashion Inc. to use transfer prices that are comparable with market prices especially when cross-border transfers are involved. In order to ease the process of transfer pricing in the various business units, Fashion Inc. uses a cost plus method, which complies with the national regulations of the various countries where Fashion Inc. has legal entities. So there are some aspects of the vertical architecture, especially in a cross-border context (Grubert & Mutti, 1991), that cannot be fully controlled by the firms’ management, which is why transfer prices and the concomitant profits of SBUs were not used as the primary incentives.

**Vignette 3: Ensuring Transfer Prices Do No Harm: Designing Managerial Incentive Systems**

To ensure that transfer prices are not manipulated, as Eccles and White (1989) suggest they might, Fashion Inc had to design carefully the compensation model, especially for divisional / SBU top managers, with particular consideration to the upstream-downstream conflicts in terms of quality. That is, it ensures that the upstream units do not provide defective goods downstream, artificially inflating their figures and capacity utilization. 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. In this way, Fashion Inc. guarded against the potentially destructive practice of selling the worst quality products in-house, or to manipulating the transfer-price system for the benefit of particular managers.

**Vignette 4: The Limits to Vertical Permeability in a World of Bounded Rationality**

Even with the appropriate compensation / managerial incentives in place, designed to support the permeable vertical architecture, “opening up” was not always easy (cf. Foss, 2003). The complexity (seen from the corporate perspective) of managing an “open” system was a factor in deciding which parts of Fashion Inc’s value chain would open up to intermediate markets, and which would not. Thus, corporate management had to veto choices of individual units to become more permeable, in order to maintain a degree of manageability, since full permeability creates potentially bewildering complexity. For instance, the “Cut” part of the CMT division was only allowed to “outstream” (which limits the sourcing to the in-house Fabric Unit), as opposed to engaging in full brokerage (i.e. the extra flexibility to use external sources of fabric in addition to captive ones). The reason for this restriction in terms of permeability was due to problems of excessive complexity when allowing upstream parts of the firm to use their capacity freely. As an executive from the capacity planning division put it, “we need someone to oversee the entire value chain”.

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