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. At each stage of the value chain a firm can make inputs or buy them, or both and transfer outputs downstream, or sell them, or both; that is, a firm's unit can be more or less "permeable" towards markets. We introduce the concept of a "vertical architecture" which defines the scope of the firm and the extent to which it is open to final and intermediate markets; it determines transfer prices and corporate incentives. Firms such as ours adopt permeable vertical architectures (partly integrated, partly open to the market) without changing their aggregate scope. They do so expecting dynamic benefits at the level of the *corporation*: first, increased permeability enables more effective utilization of resources and capacities, better matching of capabilities with market needs and market-based benchmarking to improve operational efficiency; second, partial integration enhances strategic capabilities by providing links between key parts in the value chain while partial use of the market exposes the firm to innovations developed outside its boundaries, thereby providing the impetus for new products and processes; third, increased transparency resulting from increased permeability facilitates effective resource allocation and dynamic growth. Thus, over and above ensuring transaction-level alignment, appropriate design of firm boundaries can transform a firm's strategic and productive capabilities and prospects.

(241 words)

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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 re-designing firm boundaries. Fashion Inc. completely re-designed its boundaries to cope with increasing competition and to redress the weaknesses of vertical integration and was apparently successful in doing so. Our study documents this re-design process and suggests that existing frameworks and tools can neither fully capture the nature of these changes nor account for the benefits that resulted.

Fashion Inc., a "traditionally vertically integrated" firm, gradually "opened up" its boundaries to intermediate markets. Yet, 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, as well as transfer downstream or sell, thus maintaining a partial presence along its value chain. Our evidence shows how the re-design of Fashion Inc. led to different degrees of permeability, i.e. to different ways of interfacing with internal and external customers and suppliers at each stage of the value chain. More importantly, it shows that the re-design of the firm's boundaries and the increased penetration of the market, which did not affect the firm's 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 several ways. First, it uses different units of analysis. As a result of the micro-analytic focus of Transaction Cost Economics (TCE) (Coase, 1937; Williamson, 1985), extant literature has focused mainly on 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*. These factors may play a critical part in the logic underpinning a firm's vertical scope and affecting its 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 and 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. Thus, we consider two nested levels of analysis: the *single step in the value added process* within a 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 argue that rather than just "make" or "buy", firms interface with final and intermediate markets in a variety of ways. At the SBU step of the value chain level of analysis, we observe that, in addition to "making" or "buying" (or "allying") firms often both make *and* buy inputs and sell *and* transfer outputs downstream. Such "mixed modes" have qualitative differences from traditional integrated structures and also require substantial process re-engineering to be possible. Our principal focus, though, moves beyond the single step of value chain or the SBU and considers 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*. Vertical architecture consists of the choice of (a) which parts of the value chain to be active in; (b) how the firm interfaces with internal and external suppliers and buyers at each stage of the value-added process; and (c) the vertical relations, including transfer pricing, inter-SBU resource allocation and divisional incentivization and how these are managed at corporate level. We argue that the vertical architecture, which can be more or less permeable, should be studied directly as it has important systemic properties 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."

Thus, 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 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 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 a permeable 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 internal and external benchmarking of in-house operations 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, "tapered" vertical integration (Harrigan, 1985) was used by Fashion Inc. to provide support for systemic innovation and quality management / improvement processes along the value chain. At the same time, 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. They facilitate uneven but effective growth in the value chain and enable the organization to respond to opportunities in intermediate and final markets and prevent the

weakest parts of the value chain from becoming bottlenecks that impede the firm's progress. So, rather than using partial integration to ensure that suppliers do not price unfairly (Dutta et al, 1995; Heide, 2003), we find that firms can use markets to ensure their own operations are run more effectively. Increased permeability allows identification of the most deserving parts of the firm and indicates where further investment should be directed (see Bower, 1974; 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 examine the concept of vertical permeability and then move to the question of how corporations design their vertical architectures, focusing on the dynamic benefits of vertical architectures. We conclude with limitations and discussion.

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 (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 expose a potential party to a market transaction to post hoc opportunistic re-negotiation. 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 on the TCE approach. The 1990s saw considerable debate over the interpretation of TCE findings and the type of advantage to be gained 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 co-ordination 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 co-operation" 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). 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 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 terms these structures "hybrids" which include "long-term contracts, franchising, joint ventures and the like" (Williamson, 1991: 80).

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 on 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: a) does internalization happen because of TC, based on the fear of post hoc expropriation (Klein et al., 1978; Williamson, 1985)? b) does it happen because of the need to align ownership with incentives (Grossman & Hart, 1986; Hart & Moore, 1990)? c) does it happen because of the problems of measuring and monitoring in-house (Barzel, 1981)? d) does it happen because of the firm's inability to educate potential outside suppliers about the desired properties of what will be sourced in real time (Langlois, 1992; Silver, 1984)? e) does it happen because it makes sense from a comparative advantage view (Hoetker, 2005; Jacobides & Hitt, 2005; Leiblein & Miller, 2003; Schilling & Steensma, 2001)? f) does it happen because it allows firms to focus on their strengths and thus promotes differentiation (Argyres, 1996; Gulati et al., 2005; Jacobides, 2005; Jacobides & Winter, 2005)? g) 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 retained within the boundaries of one organization) or carried out through the market or an alliance. However, the boundaries of a particular firm and the logic underlying the intertwining of individual transactional decisions along its value chain, have received far less attention.

That said, a small number of studies do contribute to our understanding of the *patterns* of choices that firms make with regard to their boundaries. A nagging question that motivates this research is why firms *both* make *and* buy the same input - that is, what persuades them to use a "mixed procurement" strategy, since most existing research would suggest that firms should *either* make *or* buy (see Bradach & Eccles,

1989)? 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 tradable parts of its needs at any point in the value chain, making the rest in-house (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 use of independent external distributors (such as the existence of lock-ins and the difficulty of finding measures to assess performance) lead to the addition of house accounts (direct internal distribution) to provide benchmarks against which the external representatives can be assessed more effectively. 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. Although this research points to the importance of understanding the factors that determine the plural mode, surprisingly little work has been carried out on this topic.

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". She suggests that firms can use tapered integration to increase both flexibility (also see Grant, 2005: Ch. 13) and bargaining power with suppliers and customers, a point also made by Porter (1980), and, earlier, in the literature on the information economics of vertical mergers (Arrow, 1975). Strangely, her findings, i.e. that tapered integration is empirically prevalent, did not generate any follow-on research, neither in the field of strategy nor in institutional economics and strategic organizational design (see Tushman and O'Reilly,(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.

Bradach (1997) builds on this approach and explicitly considers the *mechanisms* underpinning mixed modes. He 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 of 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. the number of steps in a firm's production process. 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 as given for his setting 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 firm's 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*. For those who have studied vertical scope this statement may seem provocative. Yet, 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, 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 i.e. the "boundaries" of the firm. To understand the logic of the noun, it is likely that we will need to do more than add up the individual make-or-buy-or-ally choices.[1]

An explicit analysis of firm boundaries and how the firm connects with markets helps to explain why the plural mode –both making and buying– is so common, and, crucially, points to other factors that affect the firm boundary design. Finally, 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", such as how they shape capabilities and innovation.

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 38 months (Eisenhardt, 1989; Voss et al., 2002; Yin, 1994) which involved 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), we had some theoretical constructs in mind, although we did not impose them. We looked at how our detailed evidence might inform existing theory, and we considered 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 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 into 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 together with operational information on their structure and processes, employee surveys, and other relevant documentation. We also participated in the re-engineering 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 to achieve 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 Tables 1 & 2 about here

We also 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 firm's problems. We made written notes in the interviews, tape recordings being considered too intrusive.

Furthermore, weekly meetings with the re-engineering team and twice-monthly meetings with senior management took place throughout the study period. We participated in eight workshops, involving a total of 205 employees, which aimed to identify the problems caused by the corporation's (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 aimed to ensure 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. We had also gained an understanding of the problems caused by the structure of the existing boundaries and the solutions that a vertical re-organization 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, during which time 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 which we discussed with 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 re-engineering 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 2). Finally, 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: Fiber & Fabric, CMT (Cut, Make & Trim), OBM (Original Brand-Name Manufacturing and Retail (see Gereffi, (1999) for a discussion of this sector). While most firms currently 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; Ghemawat & Nueno, 2003). These firms are still involved in manufacturing (Fabric and CMT) as well as retail. They 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 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.[2]

Why did Fashion Inc. want to Re-design its Boundaries and what did the Re-design Consist of?

Fashion Inc. is an established apparel manufacturer that 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. It had built an advantage in logistics as well as in design and responsive manufacturing and was considered a high-quality producer. Yet, with the increasing globalization of the sector, the growth of both the low-cost and the fashion segments, and the decline of the mid-market segment, Fashion Inc. was in a tough spot. The company did try to react, first by re-drawing its geographical structure. By the early 1990s, it became clear that CMT, being the most labour-intensive part of the value chain, had to 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, had to 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. Most mid-priced brands, including Fashion Inc.'s, were under severe pressure (DeutscheBank, 2002). Furthermore, there were problems with distribution. 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 to a crisis in the late 1990s. Fashion Inc. found itself unable to sell effectively, as the relative position of its retailers was dwindling. Even when it identified shelf space for its products, Fashion Inc. found it increasingly hard to compete with other rising global brands: downstream weaknesses in sales, marketing and distribution were dragging the firm down. Fashion Inc.'s strategy for the growth of its own brand was difficult. As a 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 outsourcing manufacturing did not sit well with its comparative strengths.

As a radical solution was needed, Fashion Inc.'s management 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.[3] It also 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.'s senior management felt confident that some of its capabilities could be of use to other companies that wanted to outsource their manufacturing, focusing on brand and design. Furthermore, it did not need to create new intermediate markets (Jacobides, 2005); it could open itself up to existing ones. As a result, Fashion Inc. put a template in place to systematically assess the new opportunities from changing and "opening up" its value chain structure on the basis of five key questions:

- Does an existing or latent market exist and, if so, is it accessible and attractive?
- Does the new business opportunity fit with 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?

Answers to these questions provided a blueprint for the redesign effort.[4] Subsequently, Fashion Inc decided to establish three SBUs in early 2003 which would serve internal and external clients alike:

- 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 also established a subdivision, the Outlet Unit, to handle direct sales, thus integrating forward into retail.

Top management saw the establishment of the three SBUs as a central element in Fashion Inc.'s corporate strategy. As the CEO said: "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". To turn this plan into reality, Fashion Inc. underwent a major re-organization project.

A re-engineering team was established to address internal challenges and to implement the new corporate strategy, following established re-engineering methods (Hammer & Champy, 1993; Tanner et al., 1998): Team members, drawn from various departments, were occupied full time on this project, and were supervised by the CEO who committed himself to actively supporting the re-design. Initially, the team identified and analyzed the existing operational processes (Tanner *et al.*, 1998). Day-to-day processes were mapped and reviewed and a study of the employees involved undertaken. In total, over 205 employees as well as two researchers (including 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.

Fashion Inc.'s re-design effort incorporated three major elements that came out of the company's assessment of its existing operations. First, processes required complete re-design 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). The process redesign enabled Fashion Inc.'s SBUs to become more flexible and able to deal with both its in-house units as well and external agents. Process re-organization, even more so than the creation of standardized interfaces, was a necessary condition for opening up the firm's boundaries. To provide a concrete example, Fashion Inc. had been asked by other firms to subcontract unused manufacturing capacity in both the Fabric and CMT SBUs. Before processes were redesigned, this occurred in a limited and unsystematic way, although such use of spare capacity would have been desirable; in the few instances where such intermediate trade had taken place, it had relied on the ad hoc ingenuity of individual managers. In the absence of an organizational blueprint for a generic "intermediate goods" order process, permeability along the value chain was not feasible. So new processes had to be instituted, and, critically, a new, state-of-the-art IT / ERP (Enterprise Resource Planning) system had to be installed to enable the firm to open up to intermediate markets.

The next step in the re-design of the firm's boundaries was organizational design. New job descriptions and responsibilities were devised to support the new processes and managerial areas of oversight and authority were modified to support the new structure. The effort of re-assigning responsibilities and areas of control started shortly after the process design phase was initiated in February 2003 and took about 10 months to complete - though some fine-tuning is still 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 and process 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, precipitated organizational un-bundling and vertical dis-aggregation (Jacobides, 2005).

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 more time 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 told us that without real comparison with the market 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 the CFO 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 re-design 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. As the CEO said, confirming these views: "With the old [vertically integrated] strategy, we would not be at the point we are today".

Increasing Permeability: Opening up the Boundaries Without Changing Scope

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. This suggests that we need to expand our analysis of vertical scope: A "traditional" value chain depiction focuses solely on the question of whether a firm undertakes only one or all the adjoining 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 Fashion Inc, after the re-design, 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), in addition to "tapered integration", i.e. using internal and external suppliers and transferring downstream (see also Harrigan, 1985)). Figure 2 shows the new value chain which identifies the firm's permeable vertical architecture.

Insert Figure 2 about here

So, to understand vertical scope at the level of a stage in the value-adding process, we should consider whether a unit is open on the input side (the top arrows in figure 2), on the output side (the bottom arrows in figure 2), or both. As we observed, opening up to the market in terms of inputs as opposed to outputs does have qualitative differences. The shift from internal to external buying (or a mix of both), for instance, means that a unit would need to develop new sourcing capabilities and engage in performance monitoring and new modes of inbound logistics. The shift from internal to external selling (or a mix of both), on the other hand, requires the creation 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. For this reason, it would be useful to categorize the units along a firm's value-added system in terms of whether they are open to input and output markets in future research.

The analysis of how a unit links to upstream and downstream markets leads us to our first key construct, *permeability*, which operates at the level of the stage in the value chain or the SBU. Permeability can be seen in Figure 2 where the new arrows at the top of the figure represent inputs bought from intermediate markets and where additional arrows at the bottom represent sales to intermediate markets. This provides a more satisfactory explanation of how the structure of Fashion Inc. evolved vertically. As Figure 2 shows, Fashion Inc. maintained its vertical scope; at the same time, a number of new suppliers and customers entered its value chain. In other words, the *permeability* of several of its vertical units increased, although its aggregate scope did not change.

What is interesting is why firms *want* to increase their permeability: mixed modes (i.e. both making and buying) have largely been viewed with suspicion by academics (Bradach & Eccles, 1989; Menard, 2002; Parmigiani, 2004).We wondered whether the extensive permeability in the case of Fashion Inc. was simply an inaccurate observation which would suggest 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.

Next, we examined why, at the SBU / value chain segment level of analysis, it would be advantageous for Fashion Inc to open up its boundaries. Discussions in the field pointed to two factors: first, effective capacity / resource utilization and, second, effective leveraging of differentiated capabilities along the value chain. Starting with resource and capacity usage, we were told that using external suppliers in addition to internal production is that it counters cycles and swings in downstream demand (Asanuma, 1993; Nishiguchi, 1994), and, given relatively low TC, that allows the firm to operate on an efficient scale (see Williamson, 1975; Riordan & Williamson (1985: 369). Likewise, by exploiting external customers in addition to downstream transfers, a firm can ensure that its upstream production is buffered against cyclical variations or risks of reduced internal demand (Pfeffer, 1978; Thompson, 1967). For example, Fashion Inc.'s Fabric Unit decided to cater for external customers; 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. It also shielded the Fabric Unit from declining demand from its weakening downstream CMT and OBM units.

Furthermore, we observed that both buying and selling the same type of input 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. the problem of being upmarket in manufacturing and mid-market in OBM). Permeability, then, is driven by the need to better match capacities and capabilities over and above transactional considerations. This suggests that the problem with an integrated firm is that it is only as good as its "weakest link" and that introducing a more permeable vertical architecture allows the company to operate and grow more effectively.

Vertical Architecture: The Organizational and Strategic Logic of Firm Boundaries

The benefits of opening up a firm's boundaries, though, are not limited to the advantages at the level of the SBU or the step in the value-adding process in terms of better capacity usage or capability matching. As we increasingly came to realize, a permeable vertical architecture could yield benefits at the level of *the corporation*. The permeability enhanced monitoring and learning (Sabel, 1994) and was used as a means to *redirect resources* to the most promising areas in the corporation (Bower, 1974; Burgelman, 1991), thereby enabling some parts of the value chain to grow more quickly than others. Thus, 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]

To re-iterate our definition, vertical architecture consists of the choice of: (a) which parts of the value chain to be active in; (b) how the firm interfaces with internal and external suppliers and buyers at each stage of the value-added process and (c) of the vertical relations, including transfer pricing, inter-SBU resource allocation, and divisional incentivization and how these are managed at corporate level.

Fashion Inc. changed its vertical architecture to change the way its employees worked, co-operated, and took responsibility and initiative within their own divisions. 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, in addition to better using capacities or matching capabilities. 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 to be nurtured and it supported the innovation process through a more 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 (Bower, 1974; Burgelman, 1991). So, while choices in terms of scope were matched to capabilities and TC, Fashion Inc. also employed the vertical architecture to obtain dynamic benefits, as Figure 3 indicates.

Include Figure 3 about here

The first set of benefits is the ability to help forge *effective and efficient operations. Effectiveness* was supported through the use of 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 to more effectively match its own upstream capabilities with complementary downstream capabilities of other potentially co-specialized firms. *Efficiency* of in-house production was increased as a result of being benchmarked against other non-captive firms; this allowed Fashion Inc. executives to identify problem areas and best practices alike. Such benchmarking was hard to do just by vicarious observation: While it is fairly straightforward to obtain prices for finished apparel made by other manufacturers ("just go into the next store and you know them", to quote a manager in the marketing department), in other settings it is hard to know whether an owned price is effective: transactions become "one-offs", order details vary, the number of buyers and sellers drastically decreases and reliable information is difficult to obtain. And, for such unique transactions, potential non-captive suppliers might be unwilling to provide this information. So, Fashion Inc. places outside orders in order to obtain a credible, reliable gauge. As the CFO put it, "In non-commodity markets with a limited amount of suppliers, it only makes sense to ask for prices if you have the willingness to actually place the order." Therefore, placing an order which would otherwise not be necessary to source from outside, can, over and above cost considerations, be seen as an investment in gathering information and provides Fashion Inc. with the means to monitor and benchmark. In addition, generic production functions in a dis-aggregated structure, e.g. sourcing in the different SBUs, were benchmarked against each other; this enabled rapid identification, replication and improvement of best practice. 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 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, but relied on information generated through the market to gauge the 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 so that some, non-exclusive link between the Fabric Unit's R&D and the Service Unit's sales was needed. So, while the Service Unit could have been dispensed with on the grounds of its efficiency alone, it was useful as it could help support rapid response (see Richardson,(1996) and systemic adaptation. Partial integration facilitates information flow and helps calibrate innovative designs and provides inputs in terms of design and fabric-based innovation. As such it also benefits both the Fabric and the CMT units that can be kept abreast of customer needs. Another

example where partial integration helps foster corporate capabilities is quality management: Fashion Inc. defines corporate standards for process and product quality with which every SBU must comply; yet partial integration also allows for a better way to *improve quality control* over time, using vertically adjacent divisions to foster these improvements and share throughout the firm.

On the other hand, while partial integration was used to ensure strategic capabilities were developed, partial use of the market facilitated the innovation process and increased "absorptive capacity" (Cohen & Levinthal 1990). 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 Service Unit project manager 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. Fashion Inc.'s manufacturing experience, together with information about how well the fabric sells and which features are desirable would then be fed back to the Fabric Unit. Armed with this information and a more "hands-on" knowledge of the new fabric, the Unit would be able to come up with new features or designs and possibly even 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, increasing permeability was used to promote and further enhance a more "open innovation" platform (Chesbrough, 2003).[7]

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*. 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 (in terms of "selling" their capacity internally or externally) were left to gradually decline while divisions that were efficient received more funding and greater capital investment. This mechanism for resource allocation was, in turn, intricately related to the extent of permeability. Without the option of either buying from outside or selling outside, divisions could unwittingly be penalized by the others' performance. However, within the vertically permeable architecture, 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 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 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 (c.f. Jacobides & Croson, 2001). 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, acquire more power for the executives involved. In addition, 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 incentivize 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, efficiency and effectiveness of the business units, even if it occasionally caused some (justifiable) concerns at the local level. Table 3 provides more detail and evidence on how the vertical architecture worked in our setting, focusing on the key challenges it faced, and shows how tightly interwoven firm boundaries, corporate-level incentives and divisional structures are – or, indeed, should be.

Include Table 3 about here

Still, while the permeable vertical architecture in Fashion Inc. did seem to bring a number of advantages, several potential issues should be noted. First, a permeable vertical architecture entailed a high complexity for top management (see Table 3). 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, increased permeability facilitated open innovation precisely because of the low appropriability conditions, which allowed Fashion Inc. to build on the promising trends it saw in services and goods it bought from elsewhere. Fourth, increased 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 permeable vertical architecture goes well beyond the "make, buy or ally" choice. As Figure 3 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 increasing 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.

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 permeability. Our study offers more explanatory detail about how firms choose and change their boundaries through managing their permeability at the stage of the value-adding process. 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".

Also, we provide a novel explanation as for why firms use both internal and external supplies and customers. This may be a timely exercise, as such vertically permeable structures appear to be fairly widely used: 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.

However, our core contribution lies in identifying how more or less permeable SBUs 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, and more particularly in articulating the dynamic benefits of the vertical architecture which operates at the level of the enterprise. This suggests that to appreciate the impacts of firm boundaries, we need to *concurrently* study corporate incentives and transfer prices – a substantial and promising area for future research.

Our paper also extends current research on the co-evolutionary dynamics of capabilities and firm boundaries (Cacciatori & Jacobides, 2005; Jacobides & Winter, 2005), and on "open innovation" (Chesbrough, 2003), by showing how vertical architectures affect capabilities. This approach, 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), suggests 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 resource allocation and fostering capabilities.

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, strategic and 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 3.

Our findings are also relevant to modularity research (Baldwin & Clark, 2000; Schilling, 2000). We provide a grounded view of *vertical* modularity and suggest that integration, in the sense of owning all the subsequent steps of the production process, does not preclude modularization. While we do not consider how dis-aggregating within the firm compares with dis-integration at the industry level (Jacobides, 2005),

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.

Furthermore, this paper could help bypass some of the confusing, often inconsistent discussion of "hybrids" by providing a vocabulary to describe scope and by focusing on the overall firm's boundaries. We suggest 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 firm's boundaries. That is, rather than focusing on the "verb" of making or buying, we need to consider the logic behind the structure of the "noun", i.e. a particular firm's boundaries as an entity to be studied directly.

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 identity, and how the different sets of boundaries relate. 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, without fully exploring the extent 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, even though in our case there was no franchising or "asset offloading" that took place.

Our evidence also 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 firm's boundaries against the dynamic benefits that might accrue. ,Neither did we discuss what makes vertically permeable architectures possible in the first place, or explicate the conditions under which integrated but vertically permeable structures become problematic. Clearly, there is much fertile territory for future research.

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. One important limitation is 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, 1984) 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 limited 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.

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 of using intermediate markets. The ability of particular vertical architectures, through a judicious use of 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. The analysis of vertical architecture and the distinct *modes of vertical permeability* could provide a useful tool to better understand new organizational forms and their logic (Daft & Lewin, 1990).

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. 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. The interaction between firm boundaries, transfer prices, and corporate incentives, as they shape a firm's capabilities and innovative potential, holds much promise for future research. We hope that this study will generate follow-on research on when each structure, permeable or not, can be useful or destructive to the organization employing it. The study of how external firm boundaries and internal firm structures interact to shape a firm's effectiveness and capabilities holds much promise. It could help rekindle interest in a neglected aspect of organizational design, and lead to a broader study of the *architectural principles of organizations*. Last, but certainly not least, armed with this fresh perspective, we could help create more effective organizations.

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Figure 1: The Apparel Value Chain

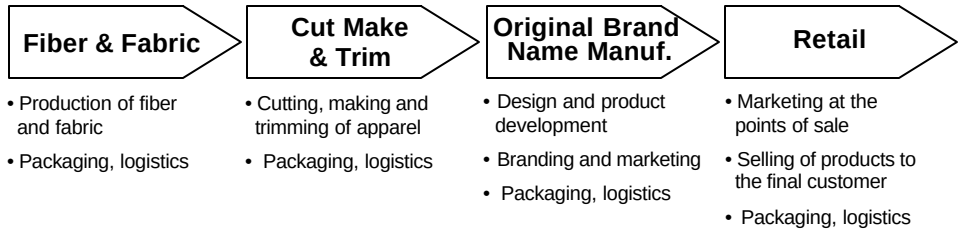

Figure 2: Fashion Inc.'s Current Value Chain: A Permeable Vertical Architecture

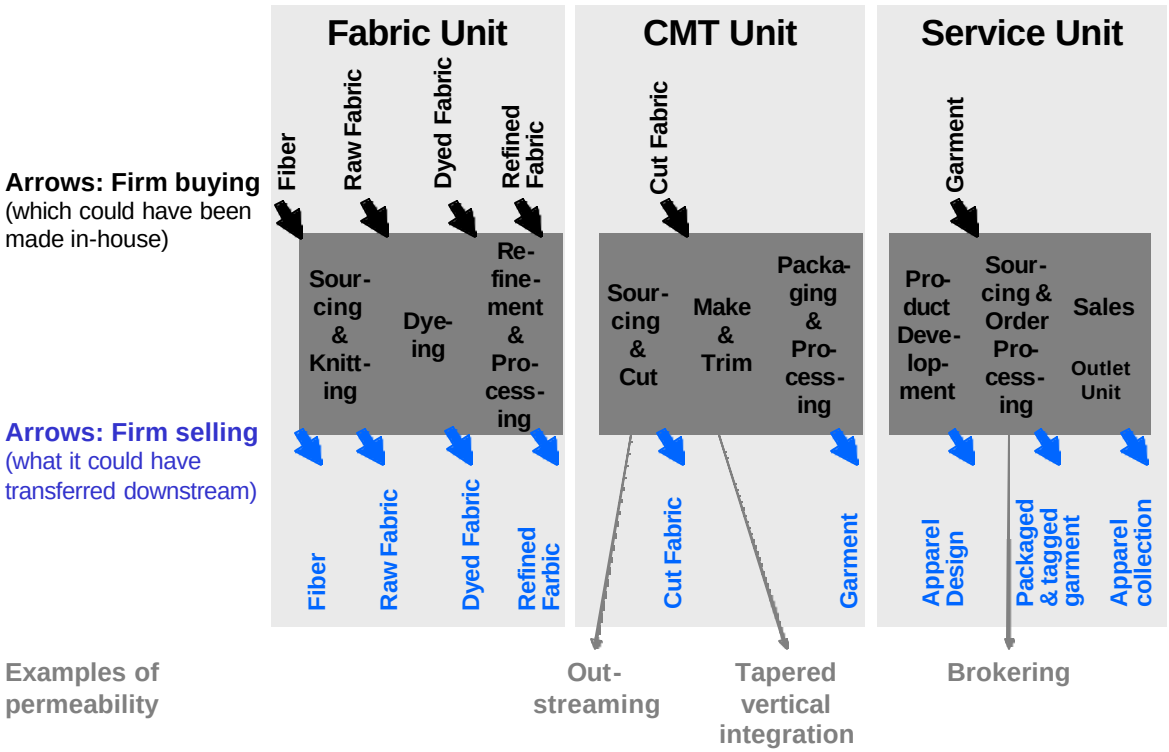

Figure 3: Vertical Architecture and its impact on Organizations

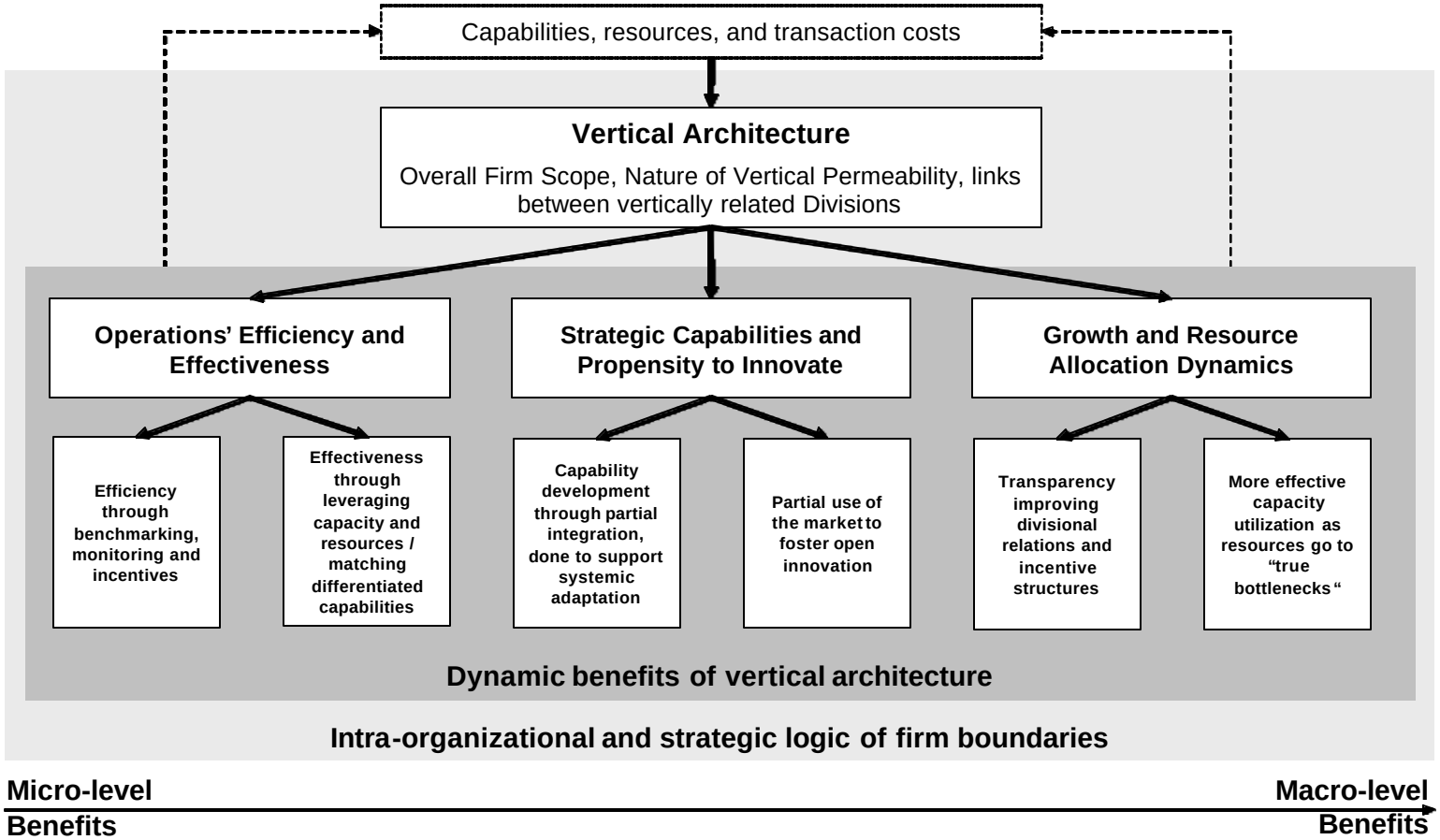

Table 1: Sources of Evidence throughout the Project

Sources of Evidence in each stage of the Project	Stage 1: June 2002 – January 2003	Stage 2: January 2003 – February 2004	Stage 3: February 2004 – July 2005
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 2; 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 2	• Workshop participation, workshop documentation (i.e. handouts, workshop transcripts, working documents, process maps) • Internal documents • Personal research notes • Project management documentation • IT-design documents • Ongoing discussions with project management team, as described in Table 2 • Semi-structured interviews to confirm theory-building, described in Table 2
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 and List of Interviews, Meetings

Type of workshop - dates	Number of participants	Number of workshops	Main objective of workshops	Demographics of workshop participants
June 2002 to January 2003				
Weaknesses in the former processes in 2002	**205**	**8**	• Identification of operational weaknesses, i.e. double-check loops • Brainstorming on possible improvements	• Employees and middle management; including all key persons of operations • 50% of which were more than 10 years with Fashion Inc.; 25% between 5 and 10 years; 25% less than 5 years
• Product development	40	1		
• Sourcing	15	1		
• Order processing	40	1		
• Customer Relationship Management	20	1		
• Production (in 4 different countries)	90	4		
October 2002 to January 2003				
Strategy	**75**	**14**	• Translation of SBU business plans into operations • Strategic framing for process redesign	• Top management • Representatives of the re-engineering team • 30% of which were more than 5 years with Fashion Inc. • 70% of which were less than 5 years with Fashion Inc.
• Market Analysis (ECR & PARTS)	10	2		
• Processes (Process & Portfolio)	10	2		
• Development (SEP, Evaluation, consol.)	10	3		
• Implementation (2 x BSC, Sourcing)	15	3		
• Quality & Review	15	4		
January 2003 to December 2004				
Process Re-design and Implementation	**43**	**65**	• Design and implementation of future processes with optimized interfaces • Identification of SBU-specific and generic processes	• Middle management and motivated key persons of operations • 95% of which were at least 5 years with Fashion Inc.
• Product development	20	25		
• Sourcing	10	15		
• Order processing	10	20		
• Customer Relationship Management	3	5		
October 2003 to February 2004				
Selection of IT platforms	**15**	**3**	• Design of IT prototypes • Selection of future IT	• Middle management and motivated key persons of operations • 95% of which were at least 5 years with Fashion Inc.
June 2002 to July 2005				
Regular Milestone & Project Meetings	**2-10**	**108**	• Project management of the change project • Verification of research layout, tentantive and final findings	• 30% more than 20 years with Fashion Inc. • 40% more than 10 years • 30% less than 2 years
• Project review meetings & discussions				
Interviews				
• General setting	**21**	**21**		
• Verification of research results				

Table 3: 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 for the "market" to be used as a reference was not without its challenges. For instance, the way in which 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, was not perceived as a problem by the executives we interviewed.
Vignette 2: The Real World Limits in Setting Managerially Effective Transfer P rices
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 firm's management, which is why transfer prices and the concomitant profits of SBUs were not used as the primary incentives.
Vignette 3: Ensuring Transfer Prices D o No Harm: Designing Managerial Incentive Systems
To ensure that transfer prices are not manipulated, as Eccles and White (1989) suggest they might be, 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 and artificially inflate their figures and capacity utilization. For instance, if a substantial number of defective products wae 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 practices of selling the worst quality products in-house or manipulating the transfer-price system for the benefit of particular managers.
Vignette 4: The Limits to Permeability in a World of Bounded Rationality
Even with the appropriate compensation / managerial incentives in place 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 and 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). This restriction in 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".

Endnotes

[1] A potential source of confusion in the literature is the occasional 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.

[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 dis-integration (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 but a large part of it was also vertically focused.

[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 changes in asset specificity in the sector, which is confirmed both by interview, 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.

[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, unsystematic efforts to capitalize on the opportunities in different parts of the value chain. For instance, CMT managers had been asked about potential use of their idle capacity and were fully aware of these prospects - indeed, they precipitated the institution of the vertically permeable structure. Thus, in reality, 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.

[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] 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), so some of the benefits were simply the result of the ability to shed some outdated and counterproductive practices, fine-tune operations and re-invigorate the corporate culture (Birkinshaw, 2000; Markides & Geroski, 2004).

[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 Bradach'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.