BUSINESS DYNAMICS: A QUARTER-CENTURY OF RESOURCE AND BUSINESS UNIT RECONFIGURATION BY JOHNSON & JOHNSON

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ABSTRACT

This paper studies how firms reconfigure their resources and business units over time, focusing on acquisitions and internal development as key aspects of business dynamics. Our hypotheses first compare the retention, deletion, and reconfiguration of internally-developed and acquired resources and business units, next address the creation of new resources in internal and acquired units, and then explore the sequence of resource and business unit reconfiguration. We explore the hypotheses using data on medical sector product lines and business units of Johnson & Johnson from 1975 to 1997. We find that both acquisitions and internal development serve as important sources of change, with key differences across the two modes. We found greater retention of internally-generated resources and units, coupled with greater reconfiguration of acquired units.
This paper studies how firms reconfigure their resources and business units over time. By reconfiguration we mean the addition, recombination, and deletion of resources and units. The conceptual basis for the study is the routine-based perspective on business dynamics. This perspective views firms as bundles of routines that provide value but also create constraints on how businesses change (Penrose 1959; Nelson and Winter 1982; Hannan and Freeman 1984).

Research in the field of strategy has focused on acquisitions as a means of overcoming barriers to change and has argued that the market-for-firms helps business overcome market failures in discrete resource exchange (Wernerfelt 1984; Chatterjee, Lubatkin, Schweiger, and Weber 1992; Capron and Mitchell 1998). Few studies, however, compare how internal development and acquisition of resources contribute to business change. Further, there are few studies of post-acquisition business reconfiguration, with a particular void of research concerning the subject of how business unit reconfiguration complements resource reconfiguration over long periods.

This paper builds on an earlier study of the medical products sector (Karim and Mitchell 2000). The earlier study focused on how firms used acquisitions as a mechanism for change and observed what kinds of resources acquirers retained. The study found that acquirers were more likely to change their resource profiles than non-acquirers, measuring change as the degree of product line reconfiguration over time. The study also found that acquirers tended to possess more resources that were new to the industry than did non-acquirers at the end of the study period. Thus, the study concluded that acquirers changed more over time than non-acquirers.

Although the earlier study showed that acquirers retain many resources from acquisitions, the research did not compare the role of acquisitions and internal development in resource reconfiguration. Moreover, the study was silent on the issue of business unit reconfiguration in either internal development or acquisitions. The current study seeks to address these open issues.

We develop three research questions that explore the issues of resource and business unit reconfiguration in acquisitions and internal development. First, we compare retention of internally-created and acquired resources and units. We expect firms to be more likely to retain internally-generated resources and units than acquired resources and units. Second, we observe the reconfiguration of business units. We expect acquired units to undergo greater reconfiguration than internally-created units; we discriminate among several types of unit
reconfiguration. Third, we study the interplay between business unit and resource reconfiguration. We expect internally-created business units to generate more new resources than acquired units. We also expect business unit reconfiguration to precede resource reconfiguration. Together, our research questions allow us to better understand the role of acquisitions, internal development, and resource and business unit reconfiguration in business dynamics.

Our empirical study focuses on resource and business unit reconfiguration at Johnson & Johnson (J&J) from 1975 to 1997. We observe J&J’s resource reconfiguration by studying changes in 91 different medical sector product lines during the two decades of the study. We also observe how the 88 medical sector business units that the company operated during this period come into existence and how J&J reconfigured them during the study period. We will discuss the focal firm, Johnson & Johnson, in greater detail later in the paper. At this point, we will note that J&J suits the study particularly well. The company underwent substantial resource and business unit activity during the study period. Moreover, J&J is a company that people often think of as consisting of independent subsidiaries that rely on internal resource creation. By contrast with this view, we demonstrate the vital importance of unit reconfiguration to the company, along with the frequency of obtaining resources via business acquisitions.

This is an unusually detailed study of firm-level resource and business unit reconfiguration. By focusing on one firm, we are able to study fine-grained business changes. In turn, this detail allows us to identify a range of potential causal threads that would be hidden in a larger-scale study that included fewer elements. Rather than generalizing statistical results to a larger population, then, the single case method uses analytical generalization to apply a particular set of results to broader theory (Yin 1979). We believe that a detailed conceptually-motivated empirical investigation provides insights that both explore focal hypotheses and yield additional suggestions. The empirical study provides an opportunity to explore our hypotheses and develop our conceptual arguments, rather than a definitive test of our predictions. Nonetheless, although we examine a single firm, the study has substantial sample size at the level of product lines and business units, which are the levels at which our predictions apply.

**MOTIVATION**

**Conceptual basis**

We frame our theory of the firm in what Karim and Mitchell (2000) refer to as a routine-based perspective on business dynamics. Williamson (1999) argues that a theory of the firm
should address five elements: behavioral assumptions, units of analysis, description of the firm, firm purpose, and an efficiency criterion. Our behavioral assumptions include potential self-interest plus bounded rationality with firm-specific foresight. Firm-specific foresight means that firms have the ability to recognize opportunities but that they may have different expectations and may be influenced by their own past experience.

Routines and resources are our units of analysis. Routines are identifiable patterns of activity embodied in human or capital assets (Nelson and Winter 1982). Routines include the rules, procedures and conventions around which firms operate and are upheld by beliefs, paradigms, and cultures (Levitt and March 1988). Firms remember routines by performing them. Routines are the skills of a firm, which help firms to learn and can also be changed through learning. In our conceptualization, routines combine together through different linkages to form particular resources that are only semi-decomposable into their component routines. Resources include physical and intangible assets, capabilities, organizational processes, firm attributes, information, and knowledge controlled by a firm that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness (Wernerfelt 1984; Barney 1991). Resources, which often include technical, production, marketing, managerial, and financial skills (Capron, Dussauge, and Mitchell 1998), provide many services to a firm. Penrose (1959: 25) notes that “Services yielded by resources are a function of the way in which they are used”, so that resources consist of bundles of potential services, and continues, "it is largely in this distinction that we find the source of the uniqueness of each individual firm."

We describe a firm as a governance structure, where governance includes coordinating, creating, and protecting routines and resources. The purpose of the firm is to economize on governance and production costs. Our efficiency criterion is of firms seeking the best available value of current and future use of routines.

The routine-based perspective studies how firms create value through protection and coordination of current routines and resources, as well as through creation and protection of new routines and resources. In this paper, we study how a firm accomplishes these resource development strategies through internal development and acquisitions.

Core concepts

This section summarizes our core concepts. We start by discussing the use of product lines as measures of routines and resources. We then address business acquisitions and internal
development as means of obtaining resources. We continue with a discussion of the need to reconfigure resources and business units, whether a firm obtains them through acquisition or internal development.

Product lines and resources.

This study uses product lines, including services and physical goods, as measures of resources. Penrose (1959) viewed the different use of resources as providing the uniqueness of a firm. We view different combinations of routines as creating particular resources, which provide firm uniqueness. The product lines that firms offer embody the firms' routines and resources (Dowell 2000). Based on this theory, a firm (e.g., Firm A) producing two different product lines (e.g., PL2 and PL5) is either using two different sets of routines (where some routines may overlap) to create those product lines or a similar set of routines which are then combined differently. If two firms (e.g., Firm A and Firm B) produce the same product line (e.g., PL7), we assume that there is significant similarity in the firms' routines applying to this product line. We further assume that there is more similarity between routines of similar product lines (e.g., PL7) produced at different firms (e.g., Firm A and Firm B) as compared to different product lines (e.g., PL5 and PL7) produced within one firm (e.g., Firm B). We believe that the product lines of business organizations are appropriate measures of firms' resources.

Acquisitions and internal development to obtain resources.

Recent strategy literature has focused on business acquisitions as means of overcoming market failures in obtaining discrete resources. Acquisitions are often a favorable mechanism for obtaining routines and resources that reside in business units within a firm (Haspeslagh and Jemison 1991; Singh and Zollo 1997). By our definition, routines lie within the structure of a firm. Acquiring human actors familiar with certain routines may not always suffice in the transition of routines without a context within which the routines function. Because routines are partially embedded in a firm’s organizational structure, acquiring an entire business unit may enhance the transfer of its routines (Nelson and Winter 1982). Routines may not be established internally due to both time diseconomies and learning constraints. Individuals face bounded rationality and have limits at which they can process information (Simon 1945; Dierickx and Cool 1989). These pose constraints on the content and speed at which individuals and firms learn. Firms may also face inertial constraints that do not allow them to develop new routines quickly (Hannan and Freeman 1989). As an alternative to internal development, which requires
time and learning, a firm may prefer to purchase a discrete resource or to acquire another business. Market failures in discrete resource exchange may arise when the resource in question is an intangible asset that a firm wishes to purchase. Tacit resources, a common example being information, face market failure in discrete resource exchange due to potential opportunism from the lack of appropriability (Teece 1982) and from coordination difficulties (Grant 1996). Theorists have argued that in the case of attaining tacit resources, the market for firms may be more robust than the market for resources (Wernerfelt 1984; Capron, Dussauge, Mitchell 1998). Thus, business acquisition may act as a means of obtaining tacit resources. For brevity, we will refer to resources that firms obtain by acquiring businesses as “acquired resources”.

Although above we outline reasons for acquiring resources rather than developing them internally, there are also drawbacks to an acquisition strategy. The drawbacks stem from both appropriation and coordination issues. Property rights and consequent appropriability issues are more clearly defined in the case of internal development (Teece 1986). In addition to easing property rights issues, internal development often offers greater understanding of how to coordinate the use of multiple resources. Nagarajan and Mitchell (1998) found that firms tend to use internal development to acquire tacit resources when technological change builds upon existing capabilities. Internal development may receive strong support when one considers that learning and synergy may be greater due to the embeddedness of the development process. Harrison, Hitt and Ireland (1991) proposed that firms can create 'uniquely valuable synergy' through internal development when differences exist in resources, and found that differences contributed to performance. Greater recognition of synergistic opportunities may exist when resources are internally developed. Firms need to be wary of exploiting acquisitions without the balance of internal exploration and building new routines themselves (Hitt, Hoskisson and Ireland 1990; March 1991). Thus, the issue is not whether internal development or acquisitions are the most appropriate means of obtaining resources, but how each of the two approaches provides distinct contributions to helping firms change.

*Resource and business unit reconfiguration.*

Resource reconfiguration and business unit reconfiguration play key roles in helping firms increase the value of their resources. Recall that Penrose (1959) described resources as providing many services to a firm depending on how they were used. Reconfiguring resources and using them in different ways provide firms with innovative opportunities. Schumpeter
(1934) viewed innovations as new combinations of knowledge and learning. In their perspective on learning, Kogut and Zander (1992) also view new capabilities as the result of combining new skills and resources. Reconfiguration of resources, whether internally developed or obtained through acquisitions, may result in innovation and provide new opportunities to a firm.

Firms may also need to reconfigure business units, either to change the resources within a unit or to adjust the level of resource use among different business units. First, reconfiguring business units may bring resources into a unit. We will discuss this idea further in the hypotheses section. Second, by reconfiguring business units, a firm can influence learning across units, by bringing together the results of previously independent activities in units. In simulations on knowledge attained by a firm, March (1991: 84) noted that multiple "independent projects may have an advantage over a single, coordinated effort. The average result from independent projects is likely to be lower than that realized from a coordinated one, but their…variability can compensate for the reduced mean in a competition for primacy". Thus, though coordination leads to doing better on average, coordinated projects are less likely to deviate significantly from the mean of the performance distribution. Consequently, independent projects are more likely to lead to abnormal returns. Often, the independent projects will take place in different business units. Once one or more independent projects bears fruit, however, it often becomes necessary to adjust a firm’s organizational boundaries to diffuse the project into related units and to draw in needed complementary resources from other units (Galunic and Eisenhardt 1996).

Strategy research has depicted various forms of business reconfiguration. Early strategy research of business reconfiguration focused on corporate restructuring through the sale or acquisition of businesses (Porter 1987; Bowman and Singh 1989; Hoskisson and Johnson 1992; Burgelman 1993). These studies highlight that firms can create new strategic positions by changing the businesses within which they operate. More recently, research has addressed reconfiguration that arises from redeploying resources between businesses. Capron, Dussauge, and Mitchell (1998) studied redeployment following horizontal acquisitions and found that redeployment was more intense for resources that faced greater market failure. They also found that greater asymmetry in resource strength led to a greater extent of resource redeployment from the firm in the stronger position to that in the weaker position. Few studies, though, have examined long term business reconfiguration.
We define reconfiguration as changing routines within a firm. In this study, we will view resource reconfiguration as the addition or deletion of product lines. We view business unit reconfiguration as the addition of business units, deletion of units, or the combination of units. The hypothesis section of the paper outlines several combinations of unit reconfiguration.

HYPOTHESES

Our hypotheses address three aspects of reconfiguration, including resource and unit retention, unit reconfiguration, and the interplay of resource and unit reconfiguration. Table 1 summarizes the predictions, while Figure 1 depicts causality and predicted signs. Figure 2 depicts Hypothesis 4 within a larger reconfiguration framework of internal development and acquisition, which we discuss as the paper proceeds.

********** Table 1, Figure 1, and Figure 2 about here **********

Resource and Unit Retention

We begin by addressing the retention aspect of reconfiguration. Firms that have developed resources internally and also have obtained some resources through business acquisitions may use these resources differently. The resources may have different characteristics or services to the firm (Penrose 1959). Similarly, internally-created units may serve different functions than those of acquired units.

First, consider resource retention. Internal development of resources often requires significant time (Dierickx and Cool 1989). The time investment may lead to greater embeddedness of routines and more learning (Nelson and Winter 1982; March 1991). Penrose (1959) refers to managerial diseconomies when highlighting the efficiency drawbacks of quick expansion that do not allow individuals to properly learn or experience. With internal development and greater exercise of routines, the resources may be better understood and a firm may be able to create greater synergy from the resources.

By internal development, firms also reduce problems of appropriability that may arise from interorganizational activities such as acquisitions. In business acquisitions, the ability to fully capture the profits from intangible resources is difficult or impossible because some of the resources may be embedded in parts of the target that are not acquired, such as corporate parents or alliance partners, or reside in target employees who were not retained. Internal development increases embeddedness in one’s own business organization and in its human capital.
Wernerfelt stressed that the power of resources in generating profits stems from their "long-term capacity to function as stepping stones to further expansion" (Wernerfelt 1984: 179; italics in original). The better managers understand the resources, the more likely they will be able to use the resources as stepping stones when the firm faces new opportunities. Compared to acquired resources, we propose that internally-developed resources result in greater embeddedness of routines, greater learning due to the time investment, and better understanding of future opportunities. We will refer to this as retentive capacity. We expect firms to have greater retentive capacity for internally-developed resources than for acquired resources.

**Hypothesis 1a**: Firms are more likely to retain internally-developed resources than acquired resources.

Next, consider unit retention. In parallel with hypothesis 1a, we propose that firms will have greater retentive capacity for internally-created units than for acquired units. Internally-created units may be viewed as the building blocks of the firm. These units are likely to retain a greater degree of embedded routines and add to a firm's norms, procedures, and culture (Nelson and Winter 1982; Levitt and March 1988). Firms may be able to only partially tap the potential of resources from acquired units due to the lack of experience with the target's routines.

The routine-based perspective on strategy theorizes that tacit resources such as knowledge and organizational memory reside within a firm’s routines and standard operating procedures (Nelson and Winter 1982; Levitt and March 1988). In their behavioral theory of the firm, Cyert and March (1963) describe standard operating procedures as learned sets of behavioral rules that reflect organizational learning processes by which a firm adapts to its environment. Teece, Pisano and Shuen (1997) refer to routines as patterns of learning. Thus, routines contain much of the knowledge of what a firm is able to accomplish and reflect what a firm has learned (Hannan and Freeman 1989). Firms are likely to retain internally-created units because they contain these valuable embedded routines that the firm has developed and the firm is familiar with these routines and knows how to use them.

Although acquired units also hold embedded routines in their structure, a firm may not be able to reap their full potential due to constraints on learning. Learning processes depend, in part, on what the firm has learned in the past (Lyles 1988), so that learning demonstrates substantial path dependence. Teece, Pisano and Shuen highlight, "a firm's past experience conditions the alternatives management is able to perceive" (1997: 524). The notion of absorptive capacity
encompasses the path dependent nature of learning (Cohen and Levinthal 1990), as does Grant's (1996) knowledge-based theory of the firm in which he notes that the capacity for aggregation is important for recipients to be able to add new knowledge to existing knowledge. Cohen and Levinthal (1990: 131) stress the importance of related knowledge: "Learning is cumulative, and learning performance is greatest when the object of learning is related to what is already known". Prior knowledge enhances learning because memory is developed by associative learning (FIOL and Lyles 1985; Huber 1991). Kogut and Zander (1992) note that firms learn in areas closely related to their existing practice because the sharing of a common stock of knowledge facilitates the transfer of knowledge within groups. In studying alliances, Lane and Lubatkin (1998) found that one firm's ability to learn from another depends upon similarities in knowledge bases. In the study of the medical industry that we discussed earlier, Karim and Mitchell (2000) also found path dependence in resource retention: acquirers were found more likely to retain targets resources that were similar to their existing resources rather than distinct resources. Thus, if a firm is not familiar with the routines of an acquired unit or if the overlapping bases are not substantial, then a firm may not harness the full potential of resources from acquired units.

**Hypothesis 1b:** Firms are more likely to retain internally-created business units than acquired units.

Our summary argument concerning resource retention and unit retention is that firms are more likely to retain internally-generated resources and units owing to the greater ability to harness the value of firm-specific routines. Internal development is more likely than acquisition to draw on a firm’s common understanding and, in turn, is more likely to contribute to the firm’s path-dependent cumulative knowledge base.

**Unit Reconfiguration**

We continue by considering the reconfiguration of business units. Recall that we defined unit reconfiguration as the addition, deletion, or recombination of units. Our core question lies in whether firms are more or less likely to reconfigure internal units as compared to acquired units.

On the one hand, one might expect internal units to require greater ongoing reconfiguration than acquired units. Acquired units come to the firm with an existing set of products and business systems. By contrast, a firm must develop the products and systems of internal units, which will require ongoing refinements. Nonetheless, refinements to internal units will often tend to involve incremental changes to existing products and systems, rather than
extensive reconfiguration (Nagarajan and Mitchell 1998). Such changes will often build cumulatively, rather than via large discrete changes. Thus, internally-created units may require relatively little reconfiguration over time.

Acquired units, by contrast, typically contain some products and systems that the firm either does not want or needs to change extensively in order to create firm-specific value. A firm may pursue an acquisition for many reasons: to acquire cospecialized assets, to avoid barriers to entry, to quickly diversify, to achieve economies of scope or scale (Bain 1956; Rumelt 1974; Caves 1981; Panzar and Willig 1981; Teece 1986). A common element of all these cases is that extensive changes are often necessary to achieve full potential value (Capron 1999). The firm will often need to undertake extensive reconfiguration in order to divest resources that it does not need and to recombine routines in ways that are relevant to its business activities.

Firms may also need to reconfigure acquired units to align them structurally with the rest of the firm. Firms may establish themselves as different structural forms such as functional versus multidivisional, hierarchically versus horizontally, and centralized versus decentralized. Structure is defined as "the design of organization through which the enterprise is administered" (Chandler 1962: 14). Components of structure include lines of authority and communication, as well as the information and data that flow through these lines (Chandler 1962). Structural design may influence what and how firms learn, as the issue of accessibility of information is a key factor of learning. Thus, acquired units may be reconfigured to improve information and work flows, and to improve learning potential.

We further note that acquired units and their resources often serve innovative purposes that require extensive reconfiguration before being accomplished. Acquired resources may be the key ingredients needed for innovation by existing units. A firm, upon realizing that a unit is in need of such resources, may undertake an acquisition to procure the resources. However, realizing the potential of targets' resources may require substantial post-acquisition reconfiguration. Figure 2 depicts this business unit reconfiguration framework. We propose a general hypothesis comparing reconfiguration of internal and acquired units.

Hypothesis 2: Firms are more likely to reconfigure acquired units than internally-created units.

In the empirical analysis, we will compare the incidence of several forms of business unit reconfiguration. We describe four options. First, a firm may dissolve an acquired unit by
combining it (part or whole) into an internally-created unit. Second, a firm may combine an acquired unit with one or more other acquired units. Third, a firm may combine two or more internally-created units. Fourth, a firm may dissolve an internally-created unit by merging it into an acquired unit.

Let us consider the four cases and the goals that each may serve. First, consider reconfiguration in which acquired units are added to internally-created units. Our arguments for Hypothesis 2 above suggest that such reconfiguration may provide internally-created units with routines needed for innovation. We expect merging of acquired units into internally-created units to be common.

Second, consider the combination of two or more acquired units. This reconfiguration strategy may serve to mold pieces of acquisitions together to gain scale or to create new resources. In this regard, one can view acquisitions as pieces of clay that a firm can attempt to mold into new shapes. Firms may retain certain resources of the acquired units, while divesting or terminating others. These arguments suggest that merging two or more acquired units with one another also is likely.

Third, consider the combination of two or more internally-created units. One case in which this may take place is if a firm is focusing its businesses and consolidating. However, usually firms create internal units for some distinct purpose. We do not expect merging of internally-created units to be common.

Fourth, consider the absorption of internally-created units into acquired units. This case creates the risk of integration problems that stem from using a less familiar business unit as the new base and thereby losing many of the embedded routines from the internally-created unit. We do not expect absorption of internally-created units into acquired units to be common.

Our summary argument concerning business unit reconfiguration is that firms are more likely to reconfigure acquired units than internally-created units. The reasons for this prediction include the need to divest unnecessary acquired resources, potential to recombine acquired routines to create firm-specific value, and need to align structural forms. We expect merger of acquired units and absorption of acquired units by internal units to be more common than merger of internal units or absorption of internal units by acquired units.
Inter-twined Resource and Unit Reconfiguration

We now turn to interactions of resource and unit reconfiguration. Two sets of issues arise here, first, creation within the firm of resources that are new to the firm and, second, the sequence of unit and resource reconfiguration.

Creation of resources that are new to the firm

First, consider creation of resources that are new to the firm. We refer to resources that existing units introduce by innovation, that is, resources that other units within the firm do not already offer, as "internally-developed resources". If a firm contains both acquired units and internally-created units and/or combinations of units, which types of units are most likely to be responsible for creating internally-developed resources?

We expect internally-created units and units that combine acquired units with internally-created units to be more likely to generate internally-developed resources than acquired units. Internally-created units tend to draw on the firm’s existing knowledge base. Several factors that contribute to innovation arise when a firm invests in an internal unit, including embedded routines, better understanding and control within the unit, and synergies created across the firm. As firms innovate and explore, they will also learn and expand the knowledge within the firm (March 1991). A common place in which firms harness the knowledge created will be in internally-created units, in which routines already exist on how to manage this new resource.

By contrast, when acquiring a unit a firm attains the physical assets but risks losing some of the underlying tacit routines. Transfer of routines in acquisitions is unlikely without the redeployment of key individuals (Walsh 1988; Capron, Mitchell, Swaminathan 2000). Within an internally-created unit, some turnover can be managed due to the embeddedness of the innovation and learning process (Argote 1996). Thus, due to possible turnover and loss of tacit routines, acquired units will tend to develop fewer new resources than internally-created units.

Acquired units may face difficulties in continuing the routines that existed when they were acquired, creating further hurdles for learning and innovation. Structure is a container for the relationships and networks within a firm (Barney 1991), serving as the context within which organizational culture and learning can develop (Lane and Lubatkin 1998). Empirical studies have found that the greater commonality of language and social networks improves learning (Tushman 1977; Darr, Argote and Epple 1995). With the loss of its original context, an acquired
Acquired units may also have difficulty in absorbing new routines for two reasons: the routinization of routines, and the lack of common knowledge to build upon. First, routines often function automatically in response to signals in the firm or the environment (Nelson and Winter 1982). It may be difficult to change routines that are conditional responses to certain stimuli. Routines change indirectly through search procedures (Cyert and March 1963). Search procedures are called upon when dealing with problems. The experience that follows helps firms to adapt their goals, attention rules, and also their search rules (Cyert and March 1963). Learning also occurs as a result of search and experimentation, which in turn change routines. If searches do not adapt, learning and innovation may suffer. Second, a common knowledge base is needed to stimulate learning and innovation. Grant (1996: 116) notes that "The importance of common knowledge is that it permits individuals to share and integrate aspects of knowledge which are not common between them", and goes on to argue that common knowledge includes language, shared meaning, and a recognition of others' knowledge sets. A shared language is necessary for effective communication within and across units (Cohen and Levinthal 1990).

We believe that the exploratory learning process and its routines will be more common in the structure of internally-created units. Further, recombination of internal and/or acquired units represents potential for Schumpetarian innovation while still maintaining internally-created routines. This may involve recombination of internally-created units or some combination of internally-created units and acquired units. We also expect these recombined units to create more new resources than acquired units or combinations of acquired units.

**Hypothesis 3a**: Internally-created business units create more new resources than acquired units.

**Hypothesis 3b**: Recombinations of internally-created units and combinations of acquired units with internally-created units create more new resources than acquired units.

Our summary argument concerning creation of new resources is that internally-created units have advantages in the innovation process due to the embedded routines they possess. The internally-developed routines support control and adaptability within the unit, while developing learning and helping the firm recognize opportunities.
The sequence of unit and resource reconfiguration

Finally, consider the sequence of unit and resource reconfiguration. Do firms reconfigure resources independently of unit reconfiguration or do the two activities inter-twine?

Consider the motivation behind reconfiguring a business unit in order to reconfigure a resource. Earlier we argued that resources and routines are embedded in structure (Nelson and Winter 1982), such that structure becomes a container for resources (Barney 1991). If a firm wishes to reconfigure a resource, one possible method would be to reconfigure the unit in which the resource resides. Issues of appropriability and tacitness of resources may make this method favorable. Firms may have more effective resource reconfiguration if the entire business unit is involved versus simply trying to add or delete a resource out of organizational context.

If the reconfiguration of business units is common, we expect that firms will reconfigure resources within the units. Stated differently, as one business unit dissolves and reconfigures into another existing unit, we expect the existing unit to undertake resource reconfiguration. In the most general case, we expect that the existing unit will add resources from the reconfigured unit. If a unit reconfigures without dissolving, that is, remains in operation but transfers key functional activities to other units, we expect that the unit will lose resources to the other units. This expectation is based on the argument that a unit’s activities stem from the resources available to the unit (Penrose 1959) and the transfer of business activities implies the transfer of resources.

**Hypothesis 4:** Business unit reconfiguration tends to precede resource reconfiguration.

Our summary argument concerning the sequence of unit and resource reconfiguration is that organizational change will tend to precede resource reconfiguration due to the embedded nature of resources in organizational structures. Further, this reconfiguration will lead to Schumpetarian innovation, through recombination of routines. The reconfiguration framework in Figure 2 implies that innovation is followed by further exploration, which may require additional resources. If so, these resources may be obtained via acquisitions. As exploration and learning continue towards future innovation, reconfiguration will likely occur again to create proper synergies. Thus, the cycle continues.

Our summary of our framework is that business unit and resource reconfiguration contribute to the sequence of activities leading to innovation. In turn, the resources and business units already existing within a firm affect reconfiguration, innovation, and acquisition.
DATA AND METHODS


For each year of the guide, we noted which J&J medical sector business units existed. We also observed which product lines the company offered in each unit, for each year. There are a total of 89 medical sector product lines during the period of study. Appendix 1 lists the product lines, which include a mix of professional medical products, pharmaceuticals and consumer products. Apart from the parent company, there were 88 business units active sometime during the period of study. Appendix 3 lists the medical sector business units at J&J. For each unit, we observed if the company created it internally, obtained it through acquisition, or derived it by reconfiguring several existing units. We also noted which units were reconfigured, divested without reconfiguration, or continued without reconfiguration during the period of the study. We believe that the data from the industry guides are accurate, based on checks and clarifications from public archival sources such as Lexis-Nexis. This is the most extensive study of resource and business unit reconfiguration that we know of at this level of detail.

By studying one firm, we were able to observe in depth the company’s business dynamics over a long period of time. Our methods consist of descriptive data, which is consistent with the exploratory conceptual development goal of the analysis. We compare numerical figures relative to starting quantities in the form of percentages. Several summary graphs depict these figures. In addition, time charts illustrate the dynamics of resources and business units, allowing us to study a quarter-century of evolution.

By tracking the product lines over each panel, we are able to observe when the product line was offered, which business unit or units contained the line, and if a resource was originally an acquired resource or an internally-developed resource. Appendix 2 depicts the product line evolution at J&J from 1975 to 1997. We list each product line on the left with its date of origin.

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and horizontally we depict which business units offered the line across time. The chart shows in which years the firm offered the product line. The shade associated with each product line, white or gray, depicts the origin of the product line. A white box means that the product line came to J&J via an acquisition. A gray box means that J&J developed the product line internally.

Appendix 4 charts the evolution of business units at J&J during the study period. Each vertical panel shows which business units operated during that year. A thick border indicates entry into J&J. A unit that appears between panels will have entered the company between the panel years, thus it will have a thick border. The shape and shade associated with a unit indicates its organizational status: a rectangle means the unit was acquired, a hexagon means the unit was internally-created, a gray rectangle means the unit is the reconfiguration of several acquired units, a gray hexagon means the unit is the reconfiguration of several internally-created units, and a gray oval means the unit is the reconfiguration of an acquired unit and an internally-created unit. Thus, shaded gray units depict reconfiguration. If a unit continues to exist, it will appear in the next panel. If pieces or all of a unit are moved into other units, or if a unit is divested or shut down, an arrow appears after the unit indicated its movement. If there is an arrow coming into a unit, then the unit has reconfigured and will be depicted with shading and may change shape.

To study the interaction between business unit and resource reconfiguration, we chart the evolution of product lines within each unit for the 1975-1997 period in Appendix 5. The chart shows, for each panel, the units that existed at that time. Units with thick borders indicate entry into J&J. The shape and shading of the units indicate their status of being acquired, internally-created, or reconfigured, similar to those in Appendix 4. Beneath each business unit, we chart the evolution of product lines that the unit offered. We list product lines in the panel year that they first arose, while strikethroughs mark subsequent additions and deletions of product lines. Similar to Appendix 2, white boxes represent product lines that the company originally acquired and gray boxes represent internally-developed lines. Boxes with diagonal shading indicate business unit reconfigurations, such that the boxes list the relevant unit numbers and arrows indicate the direction of reconfiguration. This final piece of information lets us study the sequence of unit and resource reconfiguration. We are able to observe the number of additions and deletions of product lines that occur after a unit reconfiguration as compared to those that occur without any unit activity.
RESULTS

We investigate the hypotheses by using the information in Appendices 2, 4, and 5. Figures 3 to 7 summarize this information.

We start by considering resource retention (Hypothesis 1a). Figure 3 summarizes the information in Appendix 2, which charted each product line’s evolution over the study period. Over the three decades, J&J obtained most of its product lines through acquisitions. J&J gained 60 acquired lines, 20 internally-developed lines, four lines created in joint ventures, and seven lines whose origins are unknown. We observe the status of each line in 1997. Overall, J&J retained about half (53%) of its lines. Of the 91 lines, retention is greatest for the internally-developed lines (90%), followed by acquired lines (43%) and joint-ventures (25%). The results in Figure 3 support Hypothesis 1a, which expected greater retention of internally-developed resources than acquired resources.

***Figure 3 about here***

Next, we want to determine the origin of the internally-developed new resources (Hypotheses 3a and 3b). Figure 4 summarizes the information in Appendix 5, which depicts the lines that existed within units and traced the unit origins of the 20 internally-developed lines. Twelve of the new internally-developed lines were created in internally-created units, whereas seven were created in previously acquired units. The origin of one internally-developed line is uncertain. None of the new internally-developed lines originated from a unit that came into existence via a reconfiguration.

***Figure 4 about here***

The patterns in Figure 4 support Hypothesis 3a, which states that new resources are more likely to be created in internally-created units than in acquired units. However, the patterns do not support Hypothesis 3b, which predicted that units reconfigured with pieces of internally-created units are more likely to create new resources than acquired units. This finding highlights the importance in developing new resources in units that are purely internally-created in origin.

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2 For Hypothesis 1a, we tested the significance of the difference with a log-likelihood chi-square test of independence of the 4x2 contingency table of line source (internal, acquisition, joint venture, unknown) by retention (p < .01). The 2x2 table of internal & acquisition sources v. retention (that is, dropping the joint ventures and unknown cases) also is significant (p<.01).
3 For Hypothesis 3a, recall that there were 12 internally-created units, 54 acquired units, and 19 reconfigured units. On average, then, internally-created units created 1 line each, acquired units created 7/54=0.13 lines each, and reconfigured units created 0 lines each. Tests of differences between means for line creation in the three unit source comparisons (internal-acquired, internal-reconfigured, acquired-reconfigured) are all significant (p<.01).
Finding that internally-developed resources are both highly retained and more often developed in internally-created units highlights the importance of internal development. Although the company obtained most product lines through acquisitions, the greater retention of internal lines and greater innovation by internally-created units show that internal development is a key source of change even in acquisition-active firms.

We now turn our attention to the reconfiguration of business units at J&J (Hypotheses 1b and 2). Figure 5 summarizes the information in Appendix 4, which charted the evolution of business units and noted restructuring, divestitures, and shutdowns. Fifty-four of J&J’s units during the study period were acquired, twelve units were internally-created, and nineteen units came into existence as the reconfiguration of other units. The extent of unit acquisition further reinforces our earlier finding that that most resources were obtained via acquisitions. Of the twelve internal source units, 50% continued without reconfiguration and 50% were reconfigured. The proportions for acquired units were strikingly different: 72% of acquired units were reconfigured, 20% continued without any reconfiguration, and 7% were divested without reconfiguration. Of those units that originated from unit reconfiguration, 42% were reconfigured again, 37% continued without additional reconfiguration, and 21% were divested without additional reconfiguration. The key conclusion is that the company reconfigured acquired units more commonly than internally-created units.

***Figure 5 about here***

The information in Figure 5 supports Hypothesis 1b and Hypothesis 2. First, the greatest retention in the original identity (continue without reconfiguration) was for internally-created units at 50% (versus 20% for acquired units and 37% for reconfigured units). These patterns are consistent with Hypothesis 1b, which states that internally-created units are more likely to be retained than acquired units. Second, Figure 5 also shows that acquired units are reconfigured more often (72%) than internally-created units (50%). This supports Hypothesis 2.

It is interesting to note in Figure 5 that most divestitures involved previously-reconfigured units (18 units). That is, rarely did J&J divest acquired (6 units) or internally-created units.

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4 For Hypothesis 1b, the test of the difference between means of retention (continue without reconfiguration) for internal and acquired units is significant (p<.05).
5 For Hypothesis 2, the difference between means of reconfiguration of acquired and internal units is significant (p<.05). In addition, the loglikelihood chi-square statistic for the 3x3 table of unit source (internal, acquired, reconfigured) by unit fate (reconfigure, continue without reconfiguration, divest without reconfiguration) is significant (p<.01).
developed (0 units) resources before reconfiguring them. Thus, divestitures typically follow business change activities.

The patterns in Figure 5 summarize J&J’s business unit reconfiguration strategy. J&J obtained most of its units through acquisition and reconfigured most of its acquired units. The company retained half and reconfigured half of their internally-created units; none were divested. J&J would usually reconfigure acquired and internally-created units before considering divestiture, and would often reconfigure units several times.

J&J’s reconfiguration strategy emerges further when we study the kinds of reconfiguration that took place, which Figure 6 summarizes. Some reconfigurations in Figure 6 involved similar types (own type) of units whereas others involved a mix of internally-created unit and acquired unit (cross type). Of J&J’s twelve internally-created units that existed during the study period, 33% (4 of 12) involved cross-type reconfiguration that merged pieces of acquired units into earlier internally-created units, while 17% (2 of 12) involved own-type reconfiguration that combined internally-created units (recall from Figure 5 that 6 of the 12 internally-created units resulted from reconfiguration). For the fifty-four acquired units, only 7% (4 of 54) involved cross-type reconfiguration in which pieces of internally-created units were added to acquired units, whereas 65% (35 of 54) involved own-type reconfiguration with other acquired units (recall from Figure 5 that 39 of the 54 acquired units were reconfigured). These findings further reinforce our finding that acquired units are often reconfigured, especially by combining them with resources from other acquired units.

*** Figure 6 about here***

Our final analysis is of the sequence of resource and business unit reconfiguration (Hypothesis 4). Figure 7 summarizes the information in Appendix 5 concerning the relative timing of business unit reconfiguration and addition and deletion of lines within each business unit. The company added 67 product lines within four years following business unit reconfiguration, whereas it added only 41 lines without any recent unit reconfiguration. Thus, 62% (67/108) of product line introductions followed recent business reconfigurations, while only 38% (41/108) were introduced without reconfiguration. Recent unit reconfigurations preceded 20 product line deletions, whereas only 7 lines were deleted without any recent unit activity. Thus, 74% (20/27) of product line deletions followed reconfigurations, while only 26% (7/27) did not. Moreover, we observed that most unit reconfigurations led to product line changes. These
findings suggest that the majority of product line additions and deletions follow recent business unit reconfiguration. This supports Hypothesis 4, which states that business unit reconfiguration tends to precede resource reconfiguration.6

***Figure 7 about here***

Overall, we find support for greater retention of internally-generated resources and units, and for greater reconfiguration of acquired units. The results support all hypotheses except for hypothesis 3b, which predicted that units reconfigured from internally-created units are more likely to create new resources than acquired units (instead, none of the new internally-developed lines originated from a unit that came into existence via a reconfiguration). Although J&J obtained most of its resources and units via acquisition, internal development still played a key role in creating new resources. The extent of acquisitions lends further support for the role of acquisitions in the reconfiguration framework. Acquired and internally-created units are often reconfigured before divestiture, and units are sometimes reconfigured several times. This reoccurrence of business unit reconfiguration also supports the cyclical nature of the reconfiguration framework. Resources from acquired units are often used to reconfigure internally-created units. We found support for inter-twined sequence of business unit and resource reconfiguration, as the reconfiguration framework of Figure 2 portrays.

CONCLUSION

Our goal was to investigate how a company changed over time through resource and business unit reconfiguration. Our research questions compared internally-generated resources and units to acquired resources and units. We wanted to know which resources and units were more likely to be retained or reconfigured, and determine the innovation role of the units and resources. We also wanted to observe the sequence of business unit and resource reconfiguration. Lastly, we wanted to develop a framework that incorporated reconfiguration, internal development, and acquisitions.

We found that internal development, acquisitions, and reconfiguration each play important roles in the business dynamics of a firm. Acquisitions serve as a major source of change. Most of J&J’s product lines and units were obtained through acquisitions, and acquired units were reconfigured more often than internally-created units. J&J rarely divested either type

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6 For Hypothesis 4, the difference between means of the product line additions with and without unit reconfiguration is statistically significant, as is the different between means of the product line deletions with and without reconfiguration.
of unit without first undertaking some form of reconfiguration. J&J also frequently used resources from acquired units to reconfigure internally-created units. We found that business unit reconfiguration usually preceded resource change. The majority of product line additions and deletions followed recent business unit reconfigurations, while most reconfigurations led to line changes. Though acquisitions play key roles in change, the role of internal development also stands out. J&J was more likely to retain internally-developed resources than acquired resources. These internally-developed new resources were also more likely to be created in internally-created units than in acquired units. Thus, internal development is an important source of change, even for an acquisition-active firm.

There are several directions for future research. First, of course, this study examines one firm. Significant time needs to be allocated for the long-term study of business dynamics for many firms. The hypotheses we tested need to be tested on a larger sample to see if there is a trend in resource reconfiguration strategies across firms. Further, the study does not address questions regarding performance and success of such a strategy. Future studies may also investigate the catalysts of reconfiguration and study the goals and if they are achieved. Why are some business changes successful whereas others are not? Though we offered a conceptual framework for reconfiguration, much of the framework remains to be tested. This can best be done through combining archival research with interviews with managers to determine the sequence of events and the relative roles of acquisitions and internal development. These avenues of research will help us to develop a stronger reconfiguration framework and to better understand the dynamics of change.

We believe that this study highlights the importance of acquisitions as sources of new resources for a firm. Further, acquisitions provide opportunities to change existing business units. Our findings also suggest that path-dependence matters, even in acquisition-active companies. Firms may be more likely to retain internally-developed resources than acquired resources. Also, internally-created units may be better able than acquired units to generate new resources. We hope that this work leads to further study on long-term business dynamics and a better understanding of failed and successful business change.
REFERENCES


Table 1: Relationships and Hypotheses

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<th>Relationships between x &amp; y</th>
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<td>Business unit reconfiguration</td>
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Figure 1: Summary of Hypotheses 1 through 3

![Diagram showing relationships between type of resource, type of business unit, and likelihood of retention, reconfiguration, and innovation]
Figure 2: Reconfiguration Framework Involving a Resource Development Strategy

Figure 3 (from Appendix 2): J&J Line Sources & Retention, 1975-1997
Figure 4 (from Appendix 5): Introduction of New-to-Firm Lines by Existing J&J Units

![Figure 4](image_url)

Figure 5 (from Appendix 4): J&J Business Unit Sources & Changes, 1975-1997

![Figure 5](image_url)
Figure 6 (from Appendix 4): Unit Reconfiguration Within & Across Unit Source

A&I (Cross type) vs. A&A or I&I (Own type) internal source vs. acquired units.

Figure 7 (from Appendix 5): Line Addition & Deletion Within Continuing Units, 1978-1997

Line addition to unit vs. line deletion from unit, with categories:
- After unit reconfiguration (within 4 years)
- No recent unit reconfiguration
APPENDICES

- Appendix 5: J&J Evolution of Lines within Units, 1975-1997