

Integrating Strategic Groups and the Resource Based Perspective: Understanding the Competitive Process

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Hunt's (1972) observation of asymmetric strategies pursued by strategic groups of firms in the U.S. white goods industry more than three decades ago sparked an explosion of industry and cross-industry studies. Departing somewhat from the prevailing industrial organization logic of that time, strategic groups—clusters of firms pursuing similar competitive strategies (Porter, 1980)—represent different strategic positions for different firms within a single industry. The different industry positions are separated by mobility barriers with the underlying assumption that industry success is primarily derived from intra-industry structure.

In the 1990s, researchers proposed the resource based view (Wernerfelt, 1984; Barney, 1991; Wernerfelt, 1995; Barney, 1997, 2001), suggesting that firms can be viewed as a collection of resources, skills and routines, the application of which results in positions of sustainable competitive advantage. This perspective assumes that a firm's unique set of resources and skills protects it from imitation and provides the base for accumulation of superior profits through differentiation. Thus, success is assumed not to be a function of intra-industry structure, but rather one of an effective application of accumulated resources.

Both strategic group theory and the resource based perspective attempt to explain diversity within industries. In one respect, the resource based theory adopts a *pre-strategy* position, providing an inventory of firm resources and the routines that convert them into effective strategies. In contrast, strategic group theory adopts a *post-strategy* position, offering a taxonomy of strategies employed by firms, where individual firms are classified into strategic groups through comparison of past strategic investments.

Although there are significant differences between these competing perspectives philosophically, this paper also explores the similarities between strategic group theory and the resource based view. The idea of the "corporate genome" (Aurik, Gillis, and Willen, 2002; Leask, 2002) is proposed as a model that may improve our understanding of competitive dynamics and provide a link between what firms are—the resource based view—and how firms employ their resources in the market via strategic group dynamics.

Development of Strategic Group Theory

Within Bain (1968) and Mason's (1939) structure-conduct-performance (SCP) paradigm of industrial organization (IO) economics, profitability emanates from industry structure. Industry factors are viewed as the primary influences on organizational performance (Barney, 1986). Early strategy researchers challenged the IO perspective, noting its inability to explain large performance variances within a single industry (Ghemawat, 2002). As a result, the strategic

group level of analysis was proposed as a compromise between the deterministic, industry level of analysis developed by IO economics and the organizational level of analysis studied by strategic management researchers (Hergert, 1983; Porter, 1981). Strategic groups describe apparent clusters of businesses that exhibit similar or homogeneous behavior within a somewhat heterogeneous industry environment (Fiegenbaum; McGee, and Thomas, 1988; Nouthoofd and Heene, 1997). Although both IO and strategic group theory emphasize groups of firms, the latter accounts for performance variations within industries by dissecting industries and moving closer to the firm level of analysis.

Hunt's (1972) observation of asymmetric strategies pursued by strategic groups challenged the prevailing IO paradigm. Hunt assumed that all firms pursued an optimal strategy for the industry and that performance differences between firms were solely a function of the relative application of scale. This link to the SCP paradigm remains today and underpins the twin pillars of theory that form the theoretical base of the strategic group concept, mobility barriers and intra-industry competition.

Mobility barrier theory (Caves and Porter, 1977), derives from Bain's (1968) notion of entry barriers, proposing that persistent performance differences between strategic groups may result from intra-industry barriers that prevent ease of movement between adjacent market positions and restrict erosion of firm advantages through competition or imitation. Thus, strategic groups are represented as analogous to "walled medieval cities" where the cumulative collective activities of their member firms act as barriers to access.

Movement between groups, therefore, can occur only after the elapse of considerable time or expense necessary in order to develop the required skills or resources to vault the barrier. Thus, firms enter the industry via the least protected group and subsequently follow an evolutionary path to more profitable positions staying within each group long enough to accumulate the required resources, experience and knowledge for successful assault on the next most attractive position. Here, the height of mobility barrier equates to the distance between groups and barrier height and group inaccessibility are proportional to group average profitability (Caves and Porter, 1977).

All mobility barriers are not equal however, because some operational advantages such as sales-force size or advertising are largely a function of expenditure. Conversely, patents, for example, are the result of accumulated experience, knowledge and the application of leading edge research that may take a very long time to understand, let alone duplicate. Product positions, most ultimately derived from patents represent the accumulated exercise of experience, leading edge research and both tacit and explicit sales and marketing investments and routines. Product positions therefore represent one of the least pliable of mobility barriers that ultimately determine the competitive arenas within which the company can compete. Strategy provides the link between the application of resource and performance; in turn, products are the result of the effective combination of resources to meet customer needs.

Strategic groups cannot exist without mobility barriers; in their absence, differential positions would soon be competed away. However, movement within an industry is not restricted solely by mobility barriers. Individual firms are also constrained by their resource base and the legacy

of past investments. These isolating mechanisms represent firm specific commitments (i.e., resources) that restrict the individual firm's degrees of strategic freedom and thus may prevent a firm from switching from one strategy to another (Rumelt, 1984). Within an individual strategic group, firms may vary in their ability to change strategy and respond to a given opportunity. Some may form a stable inner group and "stick to the knitting" while an outer group of firms possessing more freedom of movement may move relatively easily to an adjacent group should industry conditions warrant it. This may explain the observation that within longitudinal strategic group studies (Cool, 1985; Cool and Schendel, 1987; Martens, 1988; Fiegenbaum et al., 1990; Bogner, 1991), some firms remain stable core members of groups over time while others may switch between groups several times during the duration of a study.

The theory of intra-industry competition (Porter 1976, 1979) forms the second pillar of strategic group theory. As such, strategic group membership implies a common perspective of "how to compete." When combined with common market interests such as serving a common customer, this perspective is likely to foster the building of co-operative interests through mechanisms such as collusion. This situation is enhanced if the firms involved are similarly matched in size. In contrast, if there is considerable competitive diversity, then internecine warfare is the likely outcome and profits erode through more intense competition. Thus, Porter's theory proposes two key axes, the first, the degree of market inter-dependence and the second, the degree of similarity between strategies employed. Relative size, within a given market, determines the degree to which firms perceive each other as rivals.

A distinct stream of empirical research has supported the notion of strategic groups. Linkages between strategic group and firm performance have been identified in the brewing (Hatten and Schendel, 1977; Hatten, Schendel, and Cooper, 1978), chemical process (Newman, 1973), consumer goods (Porter, 1973), paints and allied products (Dess and Davis, 1984), industrial products (Hambrick, 1983), U.S. insurance (Fiegenbaum and Thomas, 1990), and retail mail-order (Parnell and Wright, 1993) industries, among others. However, not all studies have supported a strong relationship between strategic group membership and performance (McGee and Thomas, 1986, 1992). Ketchen and associates' (1997) meta-analysis found that strategic group membership explained only about eight percent of firm performance. Katobe and Duhan (1993) identified three strategy clusters among Japanese businesses—brand skeptics, mavericks, and true believers—and found that membership in one of the groups was not a significant predictor of performance. Rather, the link between strategy and performance appears to be moderated by organization situational variables such as the degree of emphasis on manufacturing and profitability (Davis and Schul, 1993; Zahra, 1993).

Support for the universal application of strategic groups has been mixed, however. Recent work in the field has addressed both methodological and theoretical concerns. For example, Dranove, Peteraf, and Shanley (1998) suggested that strategic groups must illustrate the presence of distinct intra-group effects that are separate and distinct from either industry effects or individual firm effects. This approach builds on the twin pillars, strengthening the idea of mobility barriers to represent some degree of group identity where firms will move in concert and the actions of the group will affect a change in actions of individual member firms. Group reputation through joint advertising and public relations exercises may therefore enhance group differentiation and

lead to group effects. Strongly intertwined markets will similarly encourage collusion or other co-operative effects that may affect group performance.

Emergence of Resource Based Theory

Dissatisfaction with the multiple firm orientation inherent in strategic group analysis may have been the primary impetus for a renewed interest in firm resources, not strategic group membership, as the foundation for firm strategy (Barney, 1991; Collis, 1991; Grant, 1991). The resulting paradigm, resource based theory, drew from the earlier work of Penrose (1959) and Wernerfelt (1984) and emphasized unique firm competencies and resources in strategy formulation, implementation, and performance. A firm's resources may include physical capital resources (technology, plant, equipment, geographic location, access to raw materials), human capital resources (training, experience, judgment, intelligence, relationships, insights, and overall quality of managers and employees), and organizational capital resources (planning, controlling, and organizing systems).

The nature of competitive advantage began to take renewed prominence within the resource based perspective, whereby competitive advantage occurs when a firm is implementing a value creating strategy not simultaneously being implemented by any current or potential competitors (Peteraf, 1993). Sustained competitive advantage exists when competitors are unable to duplicate the benefits of the strategy (Barney, 1991).

Resource based proponents have studied such firm-level issues as transaction costs (Camerer and Vepsalainen, 1988), economies of scope, and organizational culture (Barney, 1991; Fiol, 1991). Key business-level issues include the analysis of competitive imitation (Rumelt, 1984), informational asymmetries (Barney, 1986), causal ambiguities (Reed and DeFillippi, 1990), and the process of resource accumulation (Dierickx and Cool, 1989).

Initially, resource based theory was postulated as an alternative perspective to strategic group theory, challenging three key assumptions of the industrial organization foundation. First, IO assumes that firm profitability is primarily a function of industry profitability. Although this view recognizes the roles played by a variety of industry-level factors such as entry and exit barriers, it does not account for a firm's ability to redefine an industry or substantially influence its structure, even to the extent that it has no direct competitors. Resource based theorists contend that the ability of a firm to develop and utilize valuable resources is the primary determinant of its performance.

Second, resource based theory challenged the very existence of strategic groups. According to IO theory, just as industries may be identified based on similarities shared by its members, strategic groups within the industry can be defined based on strategic commonalities shared by their members. By maintaining a group level of analysis within the industry, IO researchers seek to identify appropriate strategies by comparing the performance levels of the strategic groups. In contrast, resource based theorists argue that emphasizing the strategic group level of analysis de-emphasizes the uniqueness of businesses in a given industry.

Third, IO theorists contend that information is perfect in the long run, and that any short-run heterogeneity among businesses within an industry will be eliminated as competitors purchase valuable resources at the strategic factor markets (Barney, 1991). Recognizing that all firms have common access to a common body of resources, the IO approach does not seek to measure intangible resources believed to be transitory.

In contrast, the resource based perspective recognizes that businesses within an industry or strategic group may control heterogeneous resources, and that heterogeneity may be sustained over time. Resource based theorists contend that firm resources include all assets, capabilities, organizational processes, firm attributes, information, and knowledge controlled by a firm—many of which may be intangible and/or difficult to measure—that enable it to conceive of and implement successful strategies. To the resource based theorist, ignoring firm-specific resources believed to be transitory so that researchers can incorporate a static approach to investigating firm profitability substantially reduces the precision of the analysis and is therefore unjustified. However, it should be noted that accepting the transitory nature of resources that lead to competitive advantage further complicates the research process for the resource based theorist (Dess, Gupta, Hennart, and Hill, 1995; Feurer and Chaharbaghi, 1994; Robins and Wiersema, 1995).

Criticism of strategic groups have not been limited to theoretical concerns. Many resource based theorists have questioned the predominant use of cluster analysis in many of the early strategic group studies (Cool and Schendel, 1988; Derajtys, Chrisman, and Bauerschmidt, 1993; Ketchen and Shook, 1996; Thomas and Venkatraman, 1988). It has been argued that strategic groups—at least in some cases—may be merely the artifacts of the algorithms utilized to generate clusters (Barney and Hoskisson, 1990). The primary weakness of cluster analysis is that it concentrates on similarities and does not account for strategy differences. Strictly interpreted, resource based theory would argue that forcing classifications based on any limited sets of generic strategies is inconsistent with an emphasis on resources, this approach provides a compromise that allows for unique strategy assignments while enabling tests of the strategy-performance linkage. Yet firms within a given industry face similar problems, identify similar opportunities, utilise common technology and mimic the actions of “reference firms.” Despite the unique constituents of the resource base, the application of such resources may emerge in terms of effectively similar strategies.

Other resource based theories have noted that an important element of competitive advantage derives from the tacit elements of strategy that traditional strategic group analysis fails to capture. This is because these factors are by their nature learned and are not readily discernible in company accounts although some aspects may be expressed within EVA [Economic Value Added] or MVA [Market Value Added] statements. For example, what proportion of added value stems from learned responses, experience and training of the workforce? Elements that may underpin the differences in strategy implementation referenced to by Porter (Porter, 1980), but that are not easily measured are absent from traditional strategic group studies. However, by including such considerations the interpretation of strategic groups may be rendered more accurate. The strategies of firms ultimately reflect the underlying skills and resources of the firm (Wernerfelt, 1984; Barney, 1997), and any classification of strategy by strategic grouping should endeavour to reflect this.

Integrating the Perspectives

Although the strategic group and resource based perspectives have been juxtaposed in most studies, three key linkages between the two perspectives have been identified and are elaborated herein. First, as aforementioned, strategic group theory is underpinned and inextricably linked with the concept of mobility barriers. Here, the link to resource based theory is clearly apparent as rare, inimitable resources, such as patents, appear to be a key characteristic of difficult-to-cross mobility barriers.

Second, the theory of intra-industry competition requires that firms address intertwined markets (Porter, 1979). Firms employing the same technologies with similar resource bases in terms of assets and knowledge are likely to derive similar strategies and develop similar views regarding market attractiveness. This observation is not new, however. In their study of the Scottish Knitwear industry, Porac and associates (1989) introduced the term “primary competitive group” to delineate firms whose managers tend to perceive each other as rivals.

Following this logic, rivalry is based broadly upon the technological base that firms employ and more specifically upon the degree to which products of rival firms are direct substitutes. Managers’ cognitive groups can be identified where common experiences, available market information and past competitive dynamics all contribute to common perceptions of “how to compete” in a given industry. Porac and associates (1989) suggested that common resource base, similar experience and common problems lead to a similar set of strategies. The connection between strategic groups and the resource based view is clear with cognitive groups representing a classification of intended strategies, whereas strategic groups represent similarities in realized strategy.

A third link between the two perspectives can be seen in a study of intra-industry dynamics in the U.S. pharmaceutical industry. Bogner (1991) proposed that “competitive groups” represent a more inclusive grouping that adds to strategic groups the product of past experience, routines and accumulated resources that shape member firms “degree of freedom” to shift position and move to an adjacent group. Thus, past experience constrains a firm’s ability to change strategy, a link to the core competence core rigidity theory (Leonard-Barton, 1992).

Strategic investments represent the core of strategic group formation, whereby firms making similar investments develop similar but not identical stocks of competitive responses (Bogner, Mahoney, and Thomas, 1998). The link between investment decisions and strategic group membership is clearly demonstrated by Cool’s (1985) study of the U.S. Pharmaceutical Industry. Fifteen variables were selected to represent scale, scope and resource commitments in an effort to accurately portray strategic choice within the Pharmaceutical industry. Links supported by cognitive studies (Reger, 1988; Porac et al., 1989; Voyer, 1993), conclude that managers construct a mental model on “how to compete” within a given industry and that when faced with a set of similar resource combinations, similar problems and similar objectives some convergence of strategies is likely to arise. Such mental models like resource stocks and flows will change over time and may be further influenced by learning and the imitation of competitor responses that may lead to further convergence. Thus, through the pursuit of similar customers and opportunities in similar ways, firms coalesce into strategic groups.

However, strategies measured by cognitive studies reflect intended strategies. Just as the resource based perspective identifies the resource stocks available for selection in the pursuit of goals, the intended strategy describes the perceptions of managers about what choices they pursue. Hence, both perspectives support and inform strategic group analysis about what occurs before implementation. In contrast, strategic groups measure realized strategy, the product of past not intended investment decisions.

In sum, it is suggested that the resource based view enriches and populates strategic group analysis. Whereas the IO assumptions within strategic group theory consider performance largely to derive via collusion, the resource perspective recognises the entrepreneurial nature of revolutionary change (Schumpeter, 1934), and the role played by valuable rare resources (Barney, 1997). A firm's product or service line also links the two perspectives, as elaborated in the following section.

Product Lines and the Corporate Genome Model

If one accepts that strategy represents how the company plans to achieve its objectives and that a primary element of the company's resource base is the products or services that it markets, then a natural link between the strategic group concept and the resource based perspective must be the company's product range. Increasingly however, company direction is influenced not only by internal factors of competitive advantage but also by how companies are perceived by investors. Here, expectations drive corporate management (Dobbs and Koller, 1998).

These expectations often depend on three factors, the first of which is expected future performance, a function of past sales and projected profit growth. Second, the expectation of future cash flows from new products is based on company presentations to investors and the performance of similar currently marketed products. Finally, future growth is generally expected to at least equal past growth leading to a constantly raised expectation of future performance which cannot be sustained indefinitely.

The expectation of future success hinges increasingly upon a company's product portfolio, both present and future. Shareholder expectations shape the actions of the company's top management team. Here, the company's product portfolio can be portrayed as analogous to the human "genome"—the totality of an organism's genetic material—where products represent individual genes, each serving as a focus of a set of company activities.¹ This idea can be extended to the notion of a "corporate genome." The U.K. pharmaceutical industry provides an excellent illustration of this phenomenon because it is product-driven (George and Pearson, 2002) and knowledge-based (Henderson and Cockburn, 1995), featuring long time scales and established research routines (Prentice et al., 1988) and a sustained record of high earnings (Bernheim, 2000). It is interesting to note that this high performing industry also provides a paradox because in contrast to the knowledge heterogeneity predicted by the resource based view (Barney, 1991). This knowledge intensive industry actively publishes its results in exchange for patents, the key mobility barrier that protects future company revenues.

The industry is characterised by substantial spillovers of knowledge and similar research can lead to related but significantly different outcomes (Henderson and Cockburn 1995: p. 484).

To the degree that investments in research lay the groundwork for several, related innovations, or that success in one area increases the market for all innovation in that area, payoffs across firms may be positively correlated (Henderson and Cockburn 1995: p. 488).

Thus, firm innovation contributes to the pool of industry knowledge but the ability to take advantage of that knowledge will hinge strongly upon the core competence of the firm (Henderson and Cockburn, 1994).

The main industry driver is research productivity, the ability to consistently deliver innovations in order to satisfy unmet medical need (George and Pearson 2002). Here, risk is significant with only 23 percent of compounds entering clinical trials, the point of greatest R&D expenditure, reach the market (Henderson and Cockburn, 1995: p. 485). Pharmaceutical industry leadership means mastering a very expensive game of trial and error (George and Pearson, 2002).

Once launched, company results are heavily skewed with a few blockbuster products scooping a disproportionate share of industry revenues. A product that achieves top decile performance may be expected to contribute four times more sales than a second decile performer and twenty times more sales than a median performing product (Prentice et al., 1988: p. 201). Thus, industry position is skewed by a few blockbuster products and one such product can transform and shape a company, e.g. Smith Kline French with *cimetidine*, Glaxo with *ranitidine* and Astra with *omeprazole*. The presence of such a dominant product within the company's portfolio can dictate managements' priorities, allocation of resources and views on innovation right up to patent expiry.

In pharmaceutical markets, revenue from a product is typically highest immediately prior to patent expiry when with the availability of low priced generics branded product sales decline drastically. It is not uncommon for sales to fall by up to 80 percent in the first twelve months. Until patent expiry, a firm's lead product is its top priority therefore old products within "the genome" may exert strong influence and detract from new introductions. Past successes may therefore have become core rigidities by restricting progress and diverting attention and funding away from potential new products right up until their demise (Leonard-Barton, 1992). Table 1 illustrates how dependent the U.K. top 10 pharmaceutical companies were on older products in 1999, with the bulk of most companies sales facing imminent patent expiry.

Table 1.

Product Portfolio Age Profile Top 10 U.K. Corporations

Years from Launch	AZ	GW	MSD	AHP	SKB	Pfizer	Novartis	Lilly	WL
	1999	1999	1999	1999	1999	1999	1999	1999	1999
<2 Yrs	0.8	1.9	5.7	0.5	0.4	8.1	0.3	1.4	0.9
3–5 Yrs	7.1	1.6	16.6	21.8	2.6	0.0	27.1	20.7	61.5

Years from Launch	AZ	GW	MSD	AHP	SKB	Pfizer	Novartis	Lilly	WL
	1999	1999	1999	1999	1999	1999	1999	1999	1999
6–9 Yrs	1.9	29.6	5.2	48.2	46.9	0.7	21.2	4.7	20.4
10–13 Yrs	63.9	20.5	45.9	7.5	6.2	87.0	9.8	55.4	7.0
14 Yrs +	26.3	46.3	26.7	21.9	43.9	4.2	41.6	17.8	10.2
% of Sales <5 Yrs Old	7.9	3.6	22.3	22.4	3.0	8.1	27.3	22.1	62.4
% of Sales 7–9 Yrs Old	1.9	29.6	5.2	48.2	46.9	0.7	21.2	4.7	20.4
% of Sales >10 Yrs	90.2	66.8	72.6	29.4	50.1	91.2	51.4	73.2	17.2

Source: IMS BPI Data MAT, 1999

A particularly striking, but not atypical, example is provided by Zantac, which in 1994 had three years to patent expiry, but represented over 70 percent of company sales and was Glaxo's number one priority. Despite imminent patent expiry, the company was focused more on Zantac than on new product introductions. The hostile acquisition of Wellcome in 1995 was generally perceived as a mechanism to dilute the effect of Zantac and meet shareholders' future earnings expectations. This set of competitive dynamics can be used to illustrate the model for the corporate genome.

Table 2 illustrates the corporate genome of some prominent U.K. pharmaceutical companies. Each company is active in a number of therapy areas or product groups. Each therapy area consists of an area of treatment for example cardiovascular, respiratory and dermatology are all therapy areas. Within the IMS (International Medical Systems) coding system there are 16 therapy areas each one relating to a specific body system. Each therapy area then can be divided further into sub-therapy areas that represent individual classes of treatments (e.g., A2B refers to anti-ulcerant products). Hence, the 16 broad IMS therapy areas break down into 277 sub-therapy areas. It is at this sub-therapy level that product substitution, the true locus of competition within pharmaceuticals, occurs.

Table 2.

The Corporate Genome's of Selected Pharmaceutical Manufacturers in 1994

Astra	Allen & Hanbury	Glaxo	Beecham
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Astra	Allen & Hanbury	Glaxo	Beecham
A2B	R1A	A2B	A3F
B3A	R1A	A4A	B6A
C1B	R3A	C5A	D6A
C1B	R3A	C7A	J1C
C1B	R3A	D1A	J1C
C1B	R3A	D7A	J1C
C1B	R3D	D7A	J1C
C1E	R3D	D7A	J1C
C1E	R3D	D7A	J1H
C5A	R3D	D7A	J1L
C7A	R3F	D7A	J1L
C7B	R6A	D7B	J1L
D4A		D7B	R1A
J5A		D7B	
N1B		D7B	
N1B		H2A	
N1B		H2A	
N1B		H2A	
N1B		J1D	
N1B		J1D	
N5A		J1D	
N5B		J1D	
R1A		J7B	
R3A		N2C	
R3A		S1K	
R3B			

Astra	Allen & Hanbury	Glaxo	Beecham
R3D			
T2X			

Source: IMS BPI Data MAT, 1999

The operational decisions relating to pharmaceutical products by their nature follow a path dependency. The therapeutic indication determines customer group and market. The market segment chosen ultimately leads to appropriate customer priorities. Companies may evolve new areas of research over time or continue to focus on past priorities, but past successes may tend to skew views and hence acceptance of new products. Concerns of cannibalisation may cause companies to abort or delay launch of promising new compounds. In effect, today's core capabilities act as tomorrow's core rigidities (Leonard-Barton, 1992).

Evolving into new areas presents a problem primarily due to the critical mass of knowledge required. Hence, the probability of accruing projects complementary to past successes or areas of market understanding is high. Firms seeking licences for new products tend to select companies with an established track record in that field, reinforcing the trend for companies to build on existing market franchises. The more advanced a company is within a field, the more difficult it becomes to change tracks. A geological analysis illustrates this point: Two streams may start from the same point on a hillside but moving downhill they gain momentum being deflected by differing topographies and cutting deeper into the soil. After a while their paths are so entrenched that crossing from one path to another is virtually impossible.

Within companies, research routines become established and enmeshed within the context of current markets and research priorities. Path dependency conditions the organisation to follow established proven routines, established lines of research activity (Nelson and Winter, 1982). To move from such pathways into completely new areas requires building a competence of new science and achievement of critical mass. Given the knowledge asymmetries that exist between companies such a move requires massive investment and the elapse of considerable time to build a competitive leading edge capability in a new product area, hence the attraction of acquisition as a growth option.

The merger between Pharmacia & Upjohn and Monsanto created extraordinary strength in the inflammation segment. Pharmacia & Upjohn made a conscious decision in 1997 to exit inflammation as a therapeutic area because of the lack of new product introductions. With Monsanto added to the organization, however, the Cox-2 platform that came from Searle can be leveraged and the new organization has the talent necessary to sustain and expand Pharmacia's global leadership in the area of inflammation (George and Pearson, 2002).

Interestingly, with the acquisition of a new company the corporate genome may become diluted and the likelihood of conflicting priorities may increase. This may explain in part why some companies become less effective following a merger. Alternatively, a single corporate decision can eliminate existing routines and research methods. For example, following the hostile acquisition of Wellcome by Glaxo in 1995, management decided to close the key Beckenham research site.

Acquisition of such new knowledge may be rejected and fail to flourish or it may prove slower and more difficult to assimilate than originally expected. This may be due to the lack of a suitable internal champion or because the new knowledge is more difficult to understand and assimilate. In some cases the “not invented here” (NIH) syndrome may even be a substantial barrier (Bierly and Chakrabarti, 1996), or selection may be skewed in favour of in-house research analogous to the “selfish gene theory” (Dawkins, 1989).

The Genome as a Locus of Primary Activity

The metaphor that genes are analogous to products provides an explanation as to how the collective weight of a company’s products act as a “corporate genome” channelling and prioritising the firm’s activities. Here, the importance or effective expression of the gene is directly related to two factors. The weight of the company’s sales derived from that product and the expectation for future growth attached to that product (see Figure 1).

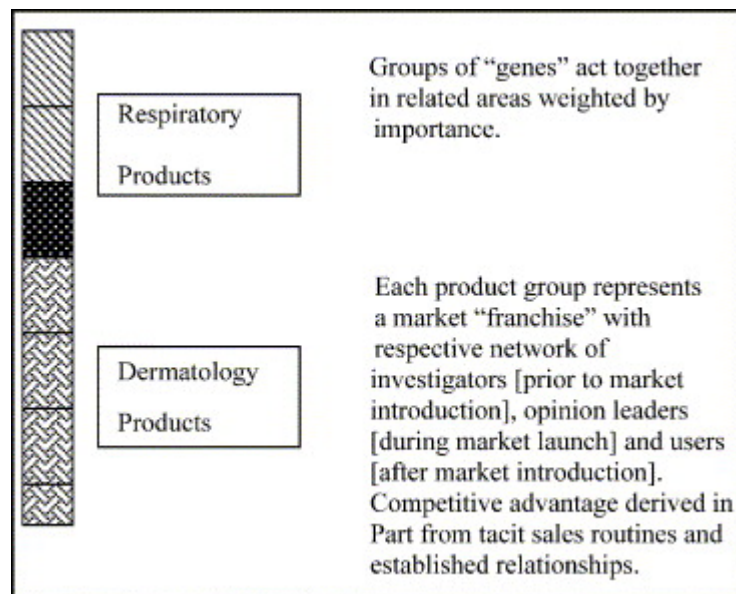


Figure 1. Individual Products Act as “Genes”

Product “genes” clustered together in therapy areas act as complementary building blocks of market reputation, a company’s franchise within a specific market segment. This position is built through two dimensions, investment and knowledge accrued in research together with market reputation the result of accumulated sales and marketing activity upon defined customer groups.

New research initiatives are more likely to build upon current research competences and accumulated knowledge because the time, cost and the learning curve necessary to build new areas of expertise is a marked barrier to entering new avenues. In addition, when a company has built a market reputation in a particular segment, licensing opportunities for complementary new products are likely to accrue to such visible areas of expertise and market success.

Scale effects in research, development and marketing will therefore act to reinforce existing market positions that are grounded in past product decisions. Resources are also likely to accrue to projects linked to existing market success and will therefore differentially build upon sustained market positions. For example, Glaxo Smith Kline applied very considerable weight behind the launch of their combination product *Seretide* that builds upon the heritage and established franchise of their Allen & Hanburys division.

Path dependent decisions will therefore stem from each successful product “gene” (Nelson and Winter, 1982); the stronger the franchise, the more entrenched the path. Decisions steeped in accumulated experience and market routines where product entry is predetermined by a set of previously successful market entry decisions and the accepted rules of engagement for that market.

Such “genes” may be transferred through merger or acquisition, but the effect of individual genes or “blocks of complementary activities” may also be diluted through combination of the genomes of two companies. Here “merger indigestion” may occur in the event that the constituent product “genes” of the two constituent company genomes are not complementary, which can lead to confusion over market priorities, political infighting and the disruption of critical tacit routines associated with research, sales and marketing activities. For example, the merger of Sweden’s Pharmacia and Michigan’s Upjohn resulted in reductions in sales, profit concerns, and turf battles (George and Pearson, 2002).

This is not the case if the two constituent genomes fit well together and complement market and research priorities. In this instance, the linking of such complementary product lines may be expected to lead to improved market position, a strengthening of the company’s market franchise, greater bargaining power with customers and operating efficiencies resulting from cost synergies as duplicate activities are eliminated. A favourable performance outcome may therefore be expected where the two companies’ strategies are compatible and a good strategic fit exists between the product lines of the merging companies. Thus, the application of the corporate genome model may provide an explanation as to why the expected improvement in research productivity and the application of scale failed to materialise in some pharmaceutical mergers, such as Glaxo Smith Kline or Aventis.

An inappropriate merger and the resulting combination of two company genomes that do not fit well together may lead to confusion, changed competitive dynamics, and even a fracture of

existing networks or alliance activities. These effects can result in a marked loss of productivity and a reduction of the original effectiveness of the individual firms. Transfer of knowledge may not therefore be complete as the dominant paradigm of one set of industrial routines may eclipse its rival during the period of integration.

The activities and routines of the firm are thus conceptualised to align closely with the product “genes” where weight of influence and hence importance is driven by current value and the expectation of their relative potential. Such routines may be adapted as new complementary products are introduced or as market positions develop thus acting in broad agreement with the conception of dynamic emergent capabilities rather than static “time worn” competences (Eisenhardt and Martin, 2000).

Following this logic, the research bedrock from which new product ideas spring is a mass of interdisciplinary competences developed over time that forms the unique “research bench” of that firm. The development of new capabilities is the ability to see such knowledge bases in a new perspective or through an alternative lens perhaps driven by recent market success or failure or fuelled by the application of new technologies to the existing “time worn” routines. Opportunities exposed by environmental change that each company may view independently from the perspective of their accumulation of research and market activities in related areas. Under conditions of market turbulence, the individual routines that relate to the product “genes” may be adjusted to take account of emerging opportunities. These actions constitute a firm’s adaptive response to market change and may in extreme conditions lead to a sharp change in corporate priorities. For example, the blacklisting of Roche anti-depressants by the U.K. Department of Health in 1985 constituted the bulk of that firm’s U.K. revenues and forced a rapid shift in corporate priorities. Under such drastic circumstances, corporate priorities and the attendant routines and processes associated with remaining products would therefore shift in relation to changes in product weighting and relative importance. Changes may also be triggered through the effect of external influences, such as shareholders, or a change in market opportunity.

Eisenhardt and associates (2000) argued that whilst such routines and “elements of best practice” that constitute dynamic capability, work effectively during times of stability, they break down under more turbulent conditions and experiment replaces routine. However, this view is not always supported by evidence from the pharmaceutical industry for four reasons (Kwanghui, 2004; Lee, 2003; Willoughby, 2004). First, because the bulk of corporate direction derives from older established products with a wealth of established interlinked routines that would be expected to resist such an experimental approach and the implied associated risk. Consider that after the merger of Astra and Zeneca, *omeprazole* still represents over 40% of combined Astra Zeneca revenue. Second, even in the event of dramatic market change, such as the loss of a major product, the observed corporate response has been one of retrenchment and resetting of priority based upon existing routines. Third, company new product launch routines invariably follow existing patterns of market behaviour.

Finally, the marketing routines of specific pharmaceutical sales-forces are finely tuned to the product priorities being delivered and represent one of the companies heaviest “organs of investment” where customer focus, type of message delivered and the means of delivery are all

highly tailored. Attempting to change such established sales-force routines may be equivalent to turning a super-tanker as actions are strongly affected by experience, current routines and past successes or failures steeped in knowledge and experience within the therapy area. Routines aligned to specific customer-representative relationships. This may explain why ostensibly successful companies within one therapy area can find it very difficult to switch therapy areas with similar success.

This point can be illustrated by the failure of Ciba Geigy (now Novartis) to market *fomoterol* a respiratory compound, when the company's strength lay in anti-rheumatics and women's health. Thus, in certain circumstances entrenched core competences reinforce and may indeed become core rigidities. This view accords with previous research (Rumelt, 1984) suggesting that firms are limited in their future options and hence restricted in changing their current market position by past decisions and experience. Accumulated knowledge both tacit and codified aligned with product associations that act independently and through complementary blocks in the form of a corporate genome. Some of these points are illustrated in the following example of competition between Astra and Glaxo in 1994. Note how both companies are strongly focused in a handful of sub-therapy areas a situation common within the pharmaceutical industry.

Astra, in 1999, the top U.K. pharmaceutical company, competed in eight of the 16 therapy areas. In contrast, revenues of the second leading firm, Allen and Hanbury's, were derived solely from respiratory products (group R), a genome similar in style to that of Beecham, a firm built on antibiotics (group J), most notably Penicillin (see Table 2).

Examination of the corporate genome of Glaxo, Allen & Hanbury (an operating company of the Glaxo corporation) and Astra reveals why Glaxo and Astra were bitter rivals in 1994. Here, Losec and Zantac were top priorities for each company, resulting in 64.8 and 75.3 percent of total company revenues respectively. A similar situation existed with Pulmicort and Becotide, number two priorities for both companies and direct substitutes, as well as for Bricanyl and Ventolin, number three priorities and direct respiratory competitors (See Table 3). This explains why in 1994 rivalry between Glaxo and Astra eclipsed all other competitors and strategies were directed solely within this intense battle.

Table 3.

Astra and Glaxo as Intense Competitors

1994			Priority Rank for Both Companies
Glaxo Labs	Alien & Hanbury	Astra	

Product s	Therap y	% of Sale s	Product s	Therap y	% of Sale s	Product s	Therap y	% of Sale s	
1	A2B	75.3				1	A2B	64.8	1
1	A4A	0.8				1	B3A	0.0	
1	C5A	0.0				5	C1B	0.1	
1	C7A	0.7				2	C1E	5.4	
1	D1A	0.2				1	C5A	0.3	
6	D7A	7.2				1	C7A	0.5	
4	D7B	0.8				1	C7B	0.2	
3	H2A	0.3				1	D4A	0.0	
4	J1D	2.4				1	J5A	0.0	
1	J7B	0.0				6	NIB	0.2	
1	N2C	12.3				1	N5A	0.0	
1	S1K	0.0				1	N5B	0.5	
			2	R1A	8.0	1	R1A	0.8	
			4	R3A	38.4	2	R3A	7.0	3
						1	R3B	0.1	
			4	R3D	52.1	1	R3D	20.1	2
			1	R3F	0.7	1	T2X	0.0	
			1	R6A	0.8				
Total	25		24			28			

Conclusions and Future Directions

A central focus of company strategy is to satisfy the demands of shareholders. Expectations of future performance rest upon the company's product portfolio and how it is leveraged in the marketplace. However, products do not work in isolation and *past success builds market position*

that in turn creates and sustains future market opportunities, which in turn shape both the future performance expectations of the firm and subsequent new product decisions.

The analogy of the corporate genome applied herein to the U.K. pharmaceutical industry offers a rich perspective on the strategic activity of a firm, one that also serves to integrate the strategic group and resource based perspectives. As such, products form the bedrock upon which corporate routines are focused with the twin aims of maximising return and building sustainable competitive advantage. Market performance results from the effective implementation of strategy where one of the key influences on management action is the expectation of the company's more influential shareholders. The past activities of the firm and the existing and ongoing relationships with customers "hard-wire" the firm's market responses where past success and established ways of working can both promote and constrain future performance.

The corporate genome model provides the means of accounting for tacit routines, market reputation and existing relationships—all so critical for market success—when evaluating and classifying strategy. Shareholder expectation increasingly drives corporate management who shape their strategies in response to what the product portfolio offers and the shareholders expect. Hence, these strategies that we classify into strategic groups link back to individual product decisions and the resource base of the firm. Future studies could expand on the concept of the corporate genome by examining other industries.

The rich detail of a firm's resource base populates and provides the additional points of differentiation necessary to classify strategies accurately, both subtle and overt, and represent a strategic choice in a given industry setting. In the same way that the accuracy of a taxonomy of strategy described by strategic group membership depends upon the right degree of detail to populate the analysis, the resource based view of the firm is sterile without the link to realized strategy that stems from the application of the firm's activities to effective revenue generation (i.e., product sales). This link is illustrated by the notion of strategic groups.

In sum, the strategic group and resource based perspectives of the firm represent different but complementary perspectives on competitive strategies and performance. Strategic group theory provides a means to aggregate firms into meaningful groups based upon the degree of similarity between their strategies, effectively linking inputs and realized strategy in terms of firm's activities. In contrast, focusing on resources and the elements that are combined in the crafting of strategies intended to meet performance objectives fosters an understanding of many of the micro processes of the firm so important in building competitive advantage. These two competing viewpoints both contribute to a more comprehensive understanding of the nature of competition.

Any attempt at building on the merits of both the strategic group and resource based perspectives must account for the varying degrees of influence of both group factors and firm resources on performance (Roquebert, Phillips, and Westfall, 1996). The influence of strategic groups on performance appears to be greatest when businesses choose to *adapt* to existing conditions rather than attempt to *influence* them. Specifically, strategies that emphasize adaptation enhance industry's role, whereas those that emphasize enactment minimize it. In industries where strategic groups may exist, businesses choose whether or not to join them.

The industry and strategic group levels of analysis should not be discarded in an attempt to better comprehend the business strategy-performance relationship (Zahra and Pearce, 1990). Indeed, both levels—in concert with the firm level—contribute to an overall comprehension of organizational performance. For example, recent studies (e.g., Dooley, Fowle and Miller, 1996; and Miles, Snow and Sharfman, 1993) have concluded that high strategic heterogeneity positively influences the overall profitability of an industry. Although these investigations have occurred at the industry level of analysis, implications for the business level are clear. Simply stated, the strategy-performance relationship may be moderated by the strategies implemented by one's competitors. Hence, industry-level studies such as these continue to increase the wealth of knowledge about individual firm strategies and performance.

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