Why is knowledge creation and transfer so difficult in large multinational corporations? Evidence from the business history of Unilever.

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A Brief Review of the Literature

Alfred Chandler, the doyen of business historians, has stressed the central role of large managerial corporations as the main engine of innovation since the Second Industrial Revolution. These large firms possessed, as Chandler describes in *Scale and Scope,* "the facilities and skills – the organizational capabilities – that simply were not available to new entrepreneurial entrants into an industry." The modern industrial enterprise, he concludes, was 'entrepreneurial and innovative in the Schumpeterian sense' (Chandler, 1990). In his recent study on the consumer electronics and computer industries, Chandler explores this theme further and has placed great emphasis on the importance of the learned capabilities of large 'core' companies who had been first movers, against whom subsequent entrepreneurial start-ups rarely made headway. (Chandler, 2001).

This view stands in sharp contrast to the evidence that over the last thirty years large corporations with vast accumulated knowledge experience profound difficulties in new business creation, although it is noteworthy that the world's 700 largest industrial firms still accounted for around one half of the world's commercial inventions as measured by patent counts in the early 1990s (Patel and Pavitt, 1991). Still, the problems caused by technological and resource lock-ins, and routine and cultural rigidities have

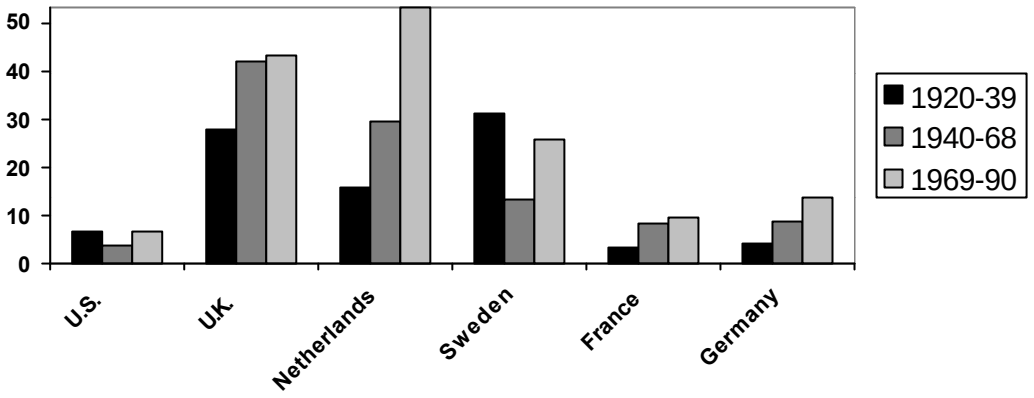
been identified and explored from multiple perspectives in economics and management (Leonard–Brown, 1995; Tushman and O'Reilly, 1997; Christensen 1997). A common theme in the literature is the importance of a firm's history. It is widely accepted that resource dependency and the stickiness of routines leads to path dependent evolution of corporate strategies and capabilities. It is evident that "learned capabilities" can also manifest themselves as "learned incapabilities."

Large firms have sought to overcome this problem in several ways. In some high technology industries, corporations such as Cisco Systems have remained innovative by buying creative venture capital start-ups, mostly in the United States. In telecoms there has been outsourcing of innovation to cheaper and possibly more creative locations, such as India's software cluster around Bangalore.

Another corporate response has been the geographical dispersion of technological capabilities within firms. This offers a means to access the variations in the nature and scope of innovation between countries, regions and localities which arise from the nature of the educational system, the business culture, and relations between firms and public authorities. It is often argued that multinationals can enhance their innovatory capabilities by drawing on research conducted in different localities, and so capture 'home base augmenting effects' (Kuemmerle, 1999).

There have been wide variations historically, as well as between countries and sectors, in the willingness of multinationals to disperse innovation (see Fig 1).

Fig 1 Share of U.S. Patenting of the Largest U.S. and European Industrial Firms Due to Research Located Abroad, 1920-1990%



Source: Cantwell (1995)

In general, US (and Japanese) firms – although less so some European companies - have been persistently reluctant to decentralize R and D facilities abroad. The firms with the most dispersed innovatory technology have been in "traditional" industries including food, drink and tobacco, building materials and petroleum. In computers, aerospace and motor vehicles, there continues to be a strong propensity to concentrate technological activities at home (Archibugi and Iammarino, 2000). The dispersion of research in different countries has often raised management challenges for multinationals.

Few multinationals still seem to actively take strategic decisions to access foreign research expertise. International mergers and acquisitions lay behind much of the observed trend of dispersion of technological capabilities in the 1990s (Patel, 1995). Nor has the effectiveness of such a strategy been demonstrated empirically. A study based on the US patenting of 24 leading Swedish multinational firms between 1946 and 1990 concluded that there was no clear link between such dispersion and the competitiveness

of firms. In some case firms had reduced their international innovation network without apparent effects on their competitiveness (Zander, 1999).

There are many unresolved issues regarding knowledge transfer within large multinationals. In internalization theory, the existence of multinationals is explained by their ability to transfer knowledge across borders more efficiently than markets. However the large theoretical literature discussing intra-firm knowledge flows - and the learning opportunities for firms opened up by internationalization – has not been matched by strong empirical evidence.

Indeed, there are reasons to believe that the efficient transfer of knowledge within the boundaries of firms has not been easy or automatic. Tacit knowledge or 'know how' is complex, difficult to codify and 'sticky' (Kogut and Zander, 1992; von Hippel, 1994). The role of people in transferring tacit knowledge has remained crucial as multinationals grew in size (Bonache and Brewester, 2001).

As corporations have grown in complexity, the organizational obstacles to knowledge diffusion may have expanded. It was a matter of negotiation between the multiple actors within firms, and it faced problems arising from incongruent incentives within organizations. There are motivational barriers to transfers. The knowledge possessed by an affiliate represents bargaining power. The extent and effectiveness of intra-firm knowledge transfer depends on the nature and efficiency of transmission channels within firms, including the willingness of head office to coerce, and also the nature of the knowledge, especially the extent to which it is tacit or ambiguous (Gupta and Govindarajan, 2000; Foss and Pedersen, 2002).

There is scattered, but anecdotal, empirical evidence to suggest that the view that multinationals provide a superior means to transfer knowledge across national borders is more a supposition than a proven reality. Indeed, one quite recent study concluded that "multinationals are not particularly well equipped to continuously transfer technological knowledge across national borders and that its contribution to the international diffusion of knowledge has been overestimated" (Solvell and Zander, 1998).

Unilever and Innovation: A Case Study

The draft chapter which follows forms one of a twelve in a book on Unilever's history between 1965 and 1990.[1] The history of Unilever before 1965 is contained in a three-volume history written by Charles Wilson (1954, 1968). This new book is organized in two parts. The first part provides a chronological account of strategy and organization over the period. The second part examines specific themes within that framework, including marketing, human resources, corporate culture, acquisitions, corporate image and innovation. The following brief notes provide a context in which to set the chapter on innovation.

Unilever's Origins and Organization

Unilever was created in 1929 by a merger between the British firm of Lever Brothers, a pioneer of branded soap manufacture founded by William Hesketh Lever (later Viscount Leverhulme), and the Margarine Unie of the Netherlands, itself a merger

[1] This paper and draft chapter are intended for discussion only. They are based on the confidential archives of Unilever PLC and Unilever NV. They must no be cited without the written permission of the Joint Secretaries of Unilever PLC and NV.

of leading Dutch margarine manufacturers including Van den Bergh and Jurgens, Hartogs' meat business at Oss, and the central European firm of Schicht.

This historical legacy exercised a powerful influence on Unilever's subsequent development. Soap (and later detergents) and margarine, both initially derived from edible oils, were to remain at the heart of Unilever's business. However Leverhulme also left a wider legacy. He diversified around the time of the First World War on a massive scale into West African trading and plantations, seeking security of raw material supplies. This was the origin of the United Africa Company (hereafter UAC), formed through another merger at the end of the 1920s, which grew as a vast trading and subsequently manufacturing business in Africa. Leverhulme's private ventures also ultimately led Lever Brothers in the 1920s into ice cream and sausage manufacture, fish shops and trawling fleets, and tinned salmon. Virtually all of these businesses were swept into Unilever which, by some estimates, was the largest company in Europe on its formation.

Unilever built an extensive multinational business. The firm's predecessors had begun in the middle of the nineteenth century to build factories in foreign countries rather than merely export products to them. The Dutch margarine companies had extensive operations not only in the Netherlands, but also in Germany and Central Europe, as well as in Britain. Lever Brothers had expanded far beyond Europe. Factories were built in other European countries, in the richer markets of the British Empire such as Canada and Australia, and in the United States. A factory was opened in Japan in 1909. During the interwar years new factories were opened in, among other countries, India, Thailand, Indonesia, China, Argentina and Brazil. By the end of the 1930s no US corporation, and

almost certainly no other European company either, could match Unilever in the sheer geographical spread of its business.

Unilever continued to expand even during the Second World War. In the United States, Unilever acquired T.J.Lipton, a leading tea company. It already owned Lever Brothers, which had been established in the late nineteenth century, and acquired a large share of the US soaps market. In Britain, Unilever acquired Batchelors Peas, one of that country's largest vegetable canners. It also purchased from General Foods in the United States the right to manufacture and sell quick frozen foods under the Birds Eye name. In the post war decades Unilever expanded further into foods, and new factories were opened in Turkey, Southeast Asia and tropical Africa.

Unilever's business spanned an extraordinary range of industries. In the mid-1960s 'edibles' – the term used for margarine and other edible oils – and soap and detergents each accounted for over a fifth of total sales, and a slightly higher proportion of profits. A further fifth of sales, and a rather lower share of profits, were in what Unilever called 'Foods', a category which excluded edible oils but included everything else, from frozen peas to ice cream to fresh meat. Unilever's remaining sales were derived from all sorts of things, from personal care - then known as Toilet Preparations (and later Personal Products) and including toothpaste, shampoos, deodorants and cosmetics – to animal feeds and chemicals manufacturing. UAC's African business accounted for nearly 15 per cent of Unilever sales. Unilever's businesses were supported by high levels of vertical and horizontal integration, which had led the firm into owning fishing fleets, fish restaurants, river and road transport businesses, packaging and printing operations, and advertising and market research agencies. In geographical terms,

Unilever made two thirds of its sales in Europe, another tenth in the United States, and the remainder in the 'rest of the world'.

During the 1960s and 1970s Unilever continued to diversify. This reflected the fashion of the time, but Unilever also had specific factors. The first was that yellow fats consumption was not growing. For a number of reasons, including slowing population growth, expanding production of convenience foods, and rising health awareness, the fat content in the national diet of northern Europe seemed to have reached a high point during the 1950s. Secondly, Unilever faced a fierce competitive onslaught on its soap and detergents business from US-based firms. In response, Unilever sought to diversify further into branded foodstuffs, including ice cream and tea. It also sought, with little success, to expand further into personal care, although an opportunity to acquire L'Oréal was turned down. In 1969 Unilever also tried but failed to acquire one of Britain's largest breweries.

There was also expansion beyond consumer goods. In 1973 Unilever acquired a cross-Channel ferry service between Britain and the Netherlands. In Africa, UAC owned and managed breweries, textile factories, department stores and automobile distributors. UAC responded to growing political risk in Africa by geographical diversification, setting up companies to sell alcohol in the Arabian Gulf and engage in logging in the Solomon Islands. It also invested in Europe, independently of Unilever. Beginning with an ill-advised joint venture with Heineken to brew beer in Burgos in Spain in the late 1960s, during the 1970s UAC invested in office machinery, medical equipment, automobile distribution and garden centers in Europe.

Markets and Competitors

Unilever's diverse business meant that it faced an extraordinary range of market structures and competed against many of the world's leading consumer goods firms. Detergents and soap were an oligopolistic market. In the immediate postwar years the soap industry had been transformed by the development of synthetic detergents. Although there were significant local firms in particular markets, four large international firms dominated the world industry. These were Unilever, Procter & Gamble (hereafter P and G), Colgate and Henkel. Unilever estimated in 1961 that these four firms accounted for 60 per cent of world sales of soap and detergents. P & G and Unilever held the largest shares, with 25 per cent and 22 per cent respectively, in that year.

P & G was less diversified than Unilever, with its non-detergents businesses confined, in the 1960s, to shampoos, toothpaste and paper products. It was also largely focused on developed markets, especially its North American home region, which accounted for nearly 90 per cent of total profits even in the 1980s. After World War Two P&G had taken the lead in the development of synthetic detergents with devastating consequences on Unilever's once substantial market share in the United States. P&G's dominant share of its home market provided it both with high profit margins and a solid base of earnings and cash generation to fund expansion in Europe, and a secure base to develop innovations which could then be transferred elsewhere. Unilever suffered a sharp loss of market share in it European home market as a result.

Unilever faced a range of market situations in personal care products, in which it held a modest 4 per cent of the world market in the 1960s. Four firms (Unilever, P & G, Colgate and Beechams, a British-based pharmaceuticals company) together accounted

for three-quarters of total world toothpaste sales outside the Communist countries, but other markets were very fragmented. In the skin and hair care businesses there were a cluster of firms, including large US consumer goods companies such as Chesebrough Ponds and Richardson Vicks, and specialist cosmetics firms, such as Avon and Estée Lauder. In Europe, the French company L'Oréal was a small company even in the 1960s, with a high percentage of its sales in France.

In margarine, Unilever was a giant in Europe, with market shares in Germany, the Netherlands and Britain – the main consumers of the product – of two thirds. Its main competitors were smaller local companies, though it's most serious competition was butter. There was a high degree of fragmentation in the food industry as a whole. The market for foods was characterized by diversity in consumer tastes and national regulations.

Organization

Unilever, like the Shell Group formed in 1907, had a dual nationality. Following the merger in 1929, Unilever retained a structure of two holding companies. Unilever Ltd (PLC after 1981) was British and capitalized in Sterling. Unilever NV was Dutch and capitalized in Guilders. Ltd and NV had different shareholders, but identical Boards. An 'Equalization Agreement' between them provided that they should at all times pay dividends of equivalent value in Sterling and Guilders. There were two chairmen and two head offices, in London and Rotterdam.

The highest authority at Unilever was the twin but identical Boards of Unilever Ltd and Unilever NV. In the mid-1960s the Boards consisted of around twenty-five full-time executives all of whom had served their entire careers with the company. They were

all male, their average age was mid-50s, and they were all British and Dutch nationals until 1973. The first Board meeting of each year delegated virtually all its powers to a Special Committee, which consisted of the Chairmen of Ltd and NV, together with a 'third man', usually the Vice Chairman of Ltd. By convention in this period, the Special Committee had two British members and one Dutch. [2] The Special Committee- which is mentioned a lot in chapter 10 - collectively performed the role of chief executive.

Unilever was not a centralized organization. The process of decision-making at Unilever was more 'bottom up' rather than 'top down'. Unilever functioned as a kind of 'parliamentary democracy' in which individual components formulated goals, and put forward cases for capital expenditure and acquisitions. These 'strategies' traveled upward to the head offices from 'operating companies' and national managements. The Special Committee served as an arbitrator over claims for resources. Consequently it was often a reactive rather than proactive force.

Unilever had grown through repeated mergers of companies who usually retained their names and brands, and this encouraged a strong belief in the virtues of 'local initiative and decentralized control.' The decentralized nature of Unilever was strikingly manifested in its portfolio of brands. The corporate name was not used as a brand, nor was it found on the packaging of any of its goods. Its manufacturing and other activities were conducted by numerous 'operating companies'. It was their names, such as Van den Bergh & Jurgens, Langnese and Birds Eye, that were known to employees and consumers. They owned thousands of different brands, most of them sold only in one country, and often originating with a local firm which had been acquired.

[2] Geoffrey Heyworth was Chairman of Ltd until 1960, Ernest Woodroofe from 1970-74 , and Kenneth Durham from 1982-86.

From the 1950s efforts began to steer Unilever in a more centralized direction with the formation of product groups, known as 'Co-ordinations'. These had originated in the early 1950s, but fierce organizational resistance mean that they were not given profit responsibility until 1966, and their status was not confirmed until after a McKinsey report in the early 1970s. Although they were originally envisaged as having worldwide product responsibilities, they were ultimately restricted to European countries also. Unilever's large business in North America and in emerging markets was managed on a geographical rather than a product basis. Unilever's decentralized organization was often contrasted with that of P & G, where decision-making was much more heavily centralized on the head office in Cincinatti.

Performance

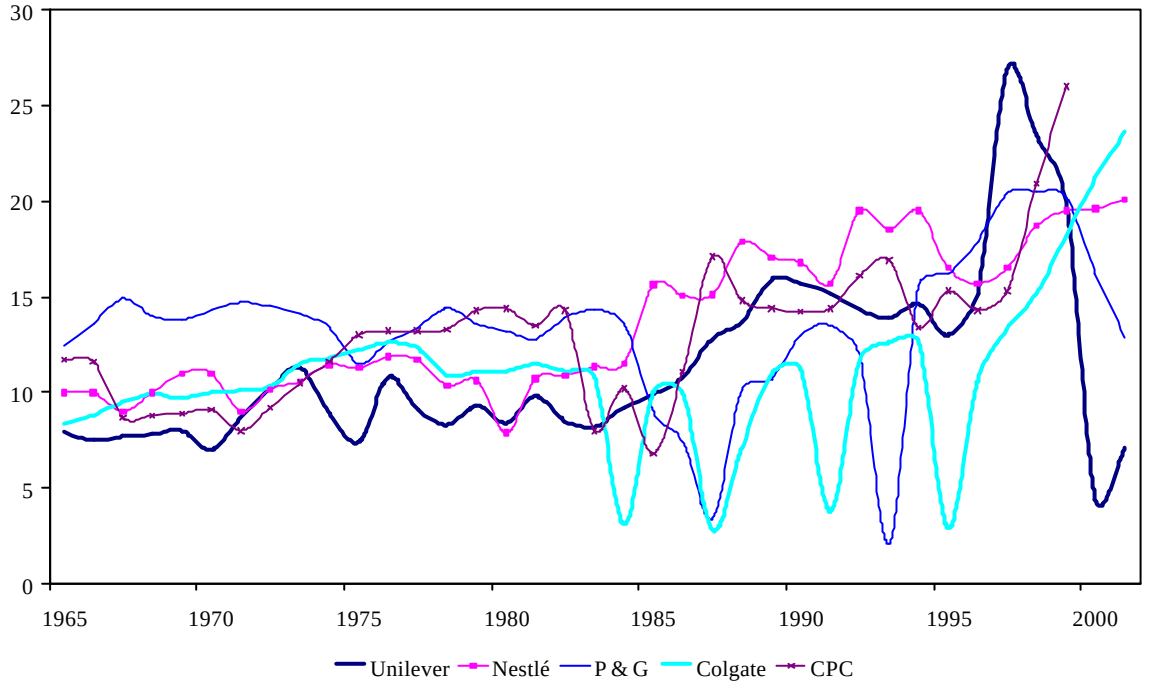
Much of Unilever's history from the 1960s revolved around the tension between retaining the benefits of local market knowledge and decision-making, while containing the disadvantages of excessive decentralization and fragmentation. The managerial costs of too much decentralization became evident as the oil crisis in 1973 transformed Unilever's home market in Europe from a fast growing 'miracle' economy into one afflicted by recession and inflation. The growing strength of European retailers and private labels undermined the profitability of branded food products. International competitors eroded Unilever's market positions in detergents. During the mid-1970s Unilever's European and US businesses became loss making, and the company remained profitable largely to the huge profits earned in West Africa by UAC and by a highly successful detergents business in emerging markets. The search for more profitable

growth opportunities through innovation, in products as diverse as fresh dairy and feminine hygiene, became urgent.

Unilever underperformed compared to international competitors from the 1970s. This was the cause of growing concern within the company which led to a major shift in strategy from the mid-1980s. (see Fig 1)

Fig 1: Unilever and its Major International Competitors.

Post-Tax Return on Capital Employed, 1965 – 2001 (%)



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Chapter 10 Innovation

In Search of Profitable Innovation

Unilever was among the largest corporate spenders on research in the world consumer packaged goods industries. By 1980 over 7000 people were employed in Unilever's research laboratories spread world-wide.[1] Yet there was a persistent concern that Unilever was not realising its full potential in innovation. In 1972 a McKinsey report on 'Achieving Profitable Innovation' concluded that, despite a level of spending which matched its competitors, Unilever was 'not a consistent leader in significant innovation'.[2] Eighteen years later another McKinsey report concluded that Unilever appeared 'to lag' in 'pioneering major new businesses', in part because its 'excellent scientific base' was 'not being fully exploited'.[3]

These observations seem curious at first sight. During the second half of the twentieth century Unilever has been responsible for scientific and technical innovation across a wide range of product areas. The problem, as illustrated in Fig 10.1 based on evidence in the McKinsey report in 1972, appeared to be that Unilever was too often a follower rather than a leader.

Fig 10.1 Unilever's Position in New Product Development 1950 – 1972

Product	Company Introducing	Date	Unilever Entry
Butter Flavour Margarine	Unilever	1950s/1960s	1950s
PUFA Margarine	Unilever/VariousUS	1950s/1960s	1959
Yoghurts Spreads	Various Various	1940s Early 1960s	1968 1969
Instant Tea	Nestlé	1950s	1960s
Early Synthetic Detergents	IG Farben,P &G,Colgate	1940s	1950
Enzyme Washers	P & G	1960s	1968
Anti-caries toothpaste	P &G	1956	1958
Head and shoulders shampoo	Vander Vilt,Olin,P&G	1961	1968
Aerosol antiperspirant	Various	1950s	1960
Bath Additives	Various	1950s	1968

Source: McKinsey & Co., Achieving Profitable Innovation (August 1972); W.J. Beek, History of Research and Engineering in Unilever 1911-1986 (Unilever, August 1996), pp. 7.12 and 7.13.

To make matters worse, it was often the case that Unilever had generated similar ideas at an earlier stage, and had also often held talks with potential suppliers of novel raw materials, but had been slow to realise market potential. This became a perennial refrain. 'History showed us to be always very slow at getting results', the Special Committee noted a decade after the McKinsey report, 'and we must develop some mechanism for reaching objectives as fast as possible'.[4]

Unilever's difficulties in 'achieving profitable innovation' proved easier to identify than to remedy. Corporate innovation is a complex process in which the contribution of scientists 'inventing' something forms only one component. Innovation

involves at least four identifiable stages - research, development, production and marketing. Unilever invested in research with the ultimate goal of gaining competitive advantage through developing new or improved products which consumers wanted to buy. Successful, or profitable, innovation required getting all the stages in the process working coherently as a package. Unilever was far from alone in finding the innovation process a difficult one to manage. Studies on the innovative activities of firms have highlighted the high uncertainty in relation to their commercial outcomes.[5] One estimate is that only about one in ten research and development projects turned out to be a commercial success, and that no profitable application emerged from about half of all industrial R. and D.

This chapter begins by considering the overall evolution of Unilever's strategies for research. This is followed by a closer examination of the work of Unilever's central research laboratories. There are then case studies of selected successes and failures in innovation which provide a fuller understanding of the organisational and cultural factors involved in the innovation process.

The Evolution of Research Strategy

An independent Research Department had been created in 1946, which became the Research Division in 1961. The identification of research as requiring a dedicated organisational structure symbolised the wide interest within Unilever, enthusiastically supported by Heyworth, in the potential of science for business. This enthusiasm was widely shared in post-war business. In Britain, overall corporate funding of research grew

at a spectacular pace, increasing sevenfold between 1950 and 1961, and many times the rate of growth of manufacturing output.[6]

Before 1945 research and development had been conducted by Unilever's numerous operating companies. The amount of spending was considerable – Unilever was in the top twenty corporate spenders on research in Britain in 1945 [7] - but one disadvantage was a considerable amount of duplication. The Research Department and later Division began a process of trying to co-ordinate the work of different laboratories, a process that over time evolved into a more directive strategy, including an interest in longer-term basic research. The rationale for making Research a central division of Unilever rested on the argument that the science and technical bases of many of its product groups were common. Between 1955 and 1960 spending on Research – essentially at the three large European laboratories at Port Sunlight, Colworth and Vlaardingen, and excluding the 'in-house' expenditure in operating companies and research spending in the United States – grew from £2.5 million to £7 million. The number of staff employed at the three laboratories increased from 900 to 1,800.[8]

Unilever research, therefore, came to be organised in two main components. The Research Division controlled central laboratories and was funded by a percentage levy on sales of companies. There were also a large number of 'in-house' facilities including factories, workshops and small 'application-oriented' laboratories located within the operating companies. These were primarily concerned with 'development', but some of the larger laboratories undertook some basic research. Between the 1960s and the 1980s these two different components accounted for about one half each of the total spending on research and development.

The function of research was seen initially as providing 'knowledge'. It was not believed that Unilever should shape too closely the direction in which research was heading, but that it should have access to the latest scientific knowledge. The Research Division allocated researchers to particular areas, initially with only limited consultation the companies. Scientists were not subject to strict controls, and were allowed to get on with the kinds of research they considered to be worthwhile.

The remoteness of much research from the marketplace differed considerably from the practices in contemporary US corporate laboratories, yet there were considerable achievements, including the development of PUFA margarines, and continuous advances in flavour research, refining and processing of fats. Unilever's growing understanding of the raw materials and processes involved in margarine manufacture was exploited both by the improvement of existing brands and the introduction of new products. These years also saw significant improvements in improved crop raw material production and in vegetable processing which underpinned the growth of the frozen foods business.

During his tenure as Research Director after 1955, and subsequently after joining the Special Committee in 1961, Woodroofe exercised a major influence over innovation strategy. He encouraged the geographical dispersion of research, including the opening of an Indian research laboratory.[9] He sought to promote a 'team culture' in research.[10] He was also an enthusiast for greater linkages between Unilever and universities, in part because of a desire to improve the quality of the company's own researchers.[11]

Woodroofe was anxious to improve certain aspects of the innovation process. The science base of the company, like much else, was badly fragmented, with

considerable rivalries between Port Sunlight and the Dutch laboratory at Vlaardingen. Vlaardingen was focused on pure research, and inclined to look down on the more applications-oriented laboratory at Port Sunlight. Woodroofe began a process of trying to build a closer relationship between the British and Dutch laboratories. He would also have liked to have built a closer relationship with Unilever's laboratory in Edgewater, New Jersey, but although he made fairly regular visits there, the autonomy of Lever Brothers meant that there was no question of Research Division taking responsibility for the laboratory.[12]

Woodroofe was also concerned that Unilever research was excessively defensive, with – he estimated in 1959 - no more than 10 per cent of research spending allocated to new product development. It seemed hard to develop radical innovations because operating companies were usually not interested in developing and marketing concepts far beyond their existing businesses.[13] They were especially not interested in technologies which might undermine their existing brands and products.

The general belief that Unilever would be able to build completely new business streams through scientific innovation rested on the contemporary view that large corporations had the capacity to extend their boundaries almost without limit. In fact, there were managerial limits to such growth, which Unilever was to discover, while it turned out that large corporations faced organisational and cultural constraints to their range of innovation. Later research on corporate innovation was to identify it as a path-dependent and cumulative process, in which 'a firm that is already successful in a given activity is a particularly good candidate for being successful with a new capacity of the same sort'.[14] In other words, while it was legitimate to expect Unilever to be at the

forefront of innovation in edible fats and detergents, building businesses on the basis of innovation in entirely new products categories was likely to be fraught with difficulty.

The formation of new organisational entities within Unilever to handle new innovations provided one possible strategy. The research laboratories produced numerous novel product ideas – for instance Port Sunlight researchers in the late 1950s produced a detergent which left washed cotton shirts crease-resistant – which were not followed up as they were too small or marginal for Unilever, but which could have been pursued by smaller, more entrepreneurial units. Woodroofe in 1959 suggested the creation of a 'cradle company' whose sole job it would be to foster new products. This was an idea well ahead of its time, and Woodroofe concluded that there would have been too much resistance to such a radical proposal for it to be implemented.[15]

Woodroofe was most concerned about the gap between researchers and the 'marketplace'. While Research was responsible for knowledge innovation, the development and marketing of products using that knowledge rested with the operating companies. There was no institutionalised mechanism for transferring concepts from Research to the companies, and the process was haphazard with companies looking round for ideas, but under no obligation to pursue them. The authority of Research did not extend beyond the laboratories to the development laboratories. Woodroofe's preference would have been for the teams of scientists who came up with a new product concept to have continued working on its development in the companies, but it was not possible to overcome the organisational chasm at the time.[16] Instead, the research laboratories were given a market research budget so they could do their own market research, while the

consultants Urwick Orr provided courses to teach researchers about the business environment.

Unilever had some deep-seated problems in its innovation process at this time arising from the fragmentation of knowledge and capabilities within the organisation. The lack of communication or even trust between different parts of the company was a major constraint. As the author of one paper on Unilever's lack of an 'outstanding record for new product innovation' observed in 1973, 'even within management groups, communication of new ideas may be delayed or inhibited by inter-company rivalry. Between management groups, new product concepts may become secret weapons in demarcation disputes with consequent duplication of effort'.[17] Financial arrangements did not help matters. The budget for central research was calculated as a percentage of sales in a specific area, so research in the largest product groups of edibles and detergents received the lion's share of resources. This rather worked against the creation of a forward looking research culture.[18]

During the 1960s the era of expansion in research spending continued. Smaller laboratories were opened in St Denis in France, Welwyn in Britain, Duiven in the Netherlands, and Hamburg in Germany. Major building programmes were launched at Port Sunlight and Vlaardingen. There was a continuing search for a closer integration of research within the company, though basic research was still assumed to be vital for sustaining competitiveness. In 1970 the Central Research Fund (CRF) was created, and allocated 10 per cent of the total annual research budget of the Co-ordinations in order to finance such basic research to be conducted in the central research laboratories. The

identification of projects to be supported was intended to be undertaken by the Research Director and the Special Committee.

By 1970 the size of the Research Division reached 4,600 staff, reflecting a five-fold increase from 1955, while the budget had reached £32 million by 1970, or almost £220 million in 1990 pounds. Total world-wide research spending was probably double that figure.[19] However during the late 1960s financial pressures began to mount as Unilever's overall performance faltered. In 1968 the smaller research laboratories began to slowly integrated into the larger ones: Duiven, for example, was merged with Vlaardingen. In 1971 budget cuts resulted in a 10 per cent cut in the Research Division's workforce. By 1975 Unilever spending on Research in constant prices had fallen sharply, again mirroring wider trends, which saw the level of corporate funding of research in Britain fall away in constant prices, and as a proportion of manufacturing output, in these years.[20] At Unilever, tighter budgets were accompanied by expectations that research should not merely generate 'knowledge', but culminate in products which could be actually sold.

This was the major thrust of McKinsey's report on Achieving Profitable Innovation in 1972. The consultants stressed the need for Co-ordinations to develop formal business strategies which could, in turn, be used as the basis to develop research strategies and priorities, which could be converted by Research Division into specific laboratory programmes. The larger companies also needed to identify more clearly consumer needs and the opportunities for new products. McKinsey recommended also organisational changes so that Research and the rest of the business could communicate

better, including the appointments of R & D managers in Co-ordinations, and product area managers in Research Division.

Although many of the McKinsey recommendations were implemented, the following years saw considerable tensions between Research and Co-ordinations, who favoured research projects with shorter time horizons which could deliver 'value for money'. Contributions to the basic research funded by the CRF were especially resented given that often there was no identifiable product as a result. In 1974 a Research Planning Group, involving the Research and Corporate Development directors, and the heads of the three largest European laboratories, was formed to try to secure tighter research 'planning' and the more effective creation of new business opportunities. More formalised and detailed reporting procedures were introduced, but it proved complex – and possibly counterproductive - to fit the work of Research Division into standardised Unilever reporting procedures. In 1976 it was first proposed that the Research Division produce a long-term plan which would combine in one document 'the objectives of the business and the strategies of research to meet them'.[21] However it was only in 1979 that the first such plan appeared.

In 1976 the CRF underwent re-organisation into two areas. The first was basic or background research structured around 'themes'. These usually encompassed a broadly defined science area – cellular behaviour and biopolymer cells were identified in 1976, and biosciences, physical sciences and engineering by 1979.[22] The second area, entitled Corporate Development, encompassed areas which might lead to major future growth, including the ill-fated Hyacinth Project discussed later. This reform contributed to an

improved relationship between Research and Co-ordinations, which included willingness by the latter to give longer commitments to research projects.[23]

Despite the growing efforts to translate new science into products, discontent at Unilever's performance in innovation grew.[24] This was part of a general corporate disillusionment, widely discernible amongst US firms also, with the commercial results of heavy spending on university-style corporate laboratories.[25] In 1978 Durham had conducted a critical internal review of Unilever's innovation performance, which he considered were hindered by 'structural and social constraints.' He recommended that European research should be concentrated at Port Sunlight, Colworth and Vlaardingen.[26] Over the following three years the smaller European laboratories were closed. In 1978 a 10 per cent cut in real expenditure on Research Division imposed for two years highlighted the dissatisfaction felt about innovation performance. Unilever's total expenditure on research and development world-wide rose from £133 million in 1978 to £219 million in 1983, but in constant prices this meant on increase whatsoever. It is unlikely that this cost cutting and search for efficiency gains did little to stimulate risk-taking innovation of the kind Unilever most needed. By 1987 spending had risen to £330 million, which did represent a real increase, but this level was still below Unilever's estimated research spending in 1970.

During the 1970s there was a problem with Unilever's innovation performance. In the fabrics wash sector of detergents Unilever accumulated a poor track record. The lag in synthetics in the 1940s and 1950s proved only the beginning of a syndrome where Unilever always seemed to be a follower rather than a leader. Unilever was slow to introduce enzymes in detergents. Unilever researchers had identified the potential

benefits which enzymes could provide - the removal of protein stains - long before the first enzymatic product, *Biotex*, was launched by Kortman & Schulte in the Netherlands. There were rumours that Unilever abandoned research on an enzymatic product at the behest of marketing people who felt there was no demand for such a good. However the primary concern was the effect an enzymatic detergent on existing products. Unilever eventually responded with *Luvil* and *Biological All*, which were successfully launched in Europe, yet during the 1970s research on enzymic products was cut for financial reasons.

Tetra-Acetyl Ethylene Diamene (TAED) was the major scientific innovation in detergents made by Unilever in these years. Medium temperature bleaching based on TAED was the most significant technical advance in fabric washing since enzymes were introduced. Its development took place in the context of a shift in European washing practice, especially from the early 1970s, from boiling at 95C to washing at much lower temperatures. This was partly in response to a fall in the proportion of white cotton clothes in the wash with the growing use of coloured cottons and synthetics – which needed to be washed at 60C or less – and partly because higher energy costs added to the cost of washing in automatic machines at high temperatures. TAED was a bleach activator which reacted with the primary oxygen bleach in a detergent to provide cleaning at lower temperatures. In the United States, most detergents used different bleach than in Europe – hypochlorite rather than persalt – which made the use of a TAED molecule more difficult.[27]

Development work began on TAED as early as the mid-1960s, but it was subsequently suspended and not re-started until 1974. By 1978 Unilever still had not successfully marketed a product containing the compound, by which time the main patent

was nearing its expiry date, and its 'major protection' against competitors beating them on to the market lay rested on an exclusive supply contract with Hoechst, who were well placed to charge Unilever a high price.[28] Concerns prevalent in Europe about the environment and energy consumption may not have been properly appreciated by the British-based Co-ordination, perhaps because average wash cycles were shorter in Britain than elsewhere in Europe. Generally the location of much detergents research at Port Sunlight may have been a problem since Britain was not a dynamic market for new trends in consumer appliances, nor was it noted for taking a lead in environmental matters.[29] By the 1980s TAED was being used by all the major detergents companies in Europe.

The slowness in detergent innovation especially during the 1970s was a major problem. Various organisational initiatives were launched to try to improve matters. New product development involved Research, Co-ordination and designated European 'lead' companies, selected on the basis of their size, market positioning and country of operation who were regarded as the initial exploiters of important new products. In detergents, the designated 'lead countries' were Britain, France, Germany and Italy. In theory, Research worked on new properties, and as these neared application it interacted with the lead companies to establish ways to apply the properties in the market. After the McKinsey report in 1972 'product area managers' were introduced to interact between Research and European operating companies, but with disappointing results. In 1975 the Research and Development Application Unit was established at Vlaardingen specifically charged with transferring and applying fully developed product and process technology to European operating companies. The RDAU included managers with company

development experience, and development managers from the companies were seconded to work at Vlaardingen. A few years later the Overseas Research Application Centre was set up at Port Sunlight to help provide specialised resource for Overseas markets.

A recurring pattern at Unilever seemed to be that, having developed a technology, it was assumed that there was a ready consumer market for products based on it. Unilever seemed locked into the assumption that consumers would want to buy things in which it had innovated, and hardly felt the need to seek their views. This assumption was increasingly erroneous as memories of past scarcities faded and consumers became more diverse and selective. The cases of long-life yoghurt and the Hyacinth feminine hygiene project, discussed below, were indicative of this problem.

During the 1980s there was a new determination to improve the innovation record, although there were different emphases. The Special Committee was primarily concerned to make Research more selective in its use of resource. In 1985 they asked for 'doubtful cases' to be brought to them, as they 'did not want to start diversifying again in a multitude of directions'.[30] The Special Committee wanted to get more commercially successful products in the 'core' businesses out in the marketplace quicker than in the past.

A different emphasis was found among a number of directors who believed that Unilever's science base represented enormous potential which needed to be exploited more effectively. They wanted faster innovation of marketable products, also believed that Unilever had the capacity to use existing resources to build new business streams through innovation. These directors included Sir Geoffrey Allen, a chemical engineer with a background in universities and government, who Orr had recruited as Research

Director in 1980, Wally Grubman, the chairman of National Starch, and T. Thomas, a chemical engineer by training and former chairman of Hindustan Lever, who Orr had appointed to the main board as Chemicals Co-ordinator in 1980.

Allen had a longstanding experience of the interface between science and business, and he was firmly convinced that research needed to be matched to the needs of business, and that this was wholly compatible with maintaining the highest calibre of science. He felt that engineering played a vital role in turning bright ideas into actual products, and in 1983 Research Division was renamed the Research and Engineering Division, while the CRF became the CREF. Allen oversaw a shift in emphasis in research from seeking to develop new products to trying to focus it on the explicit needs of the business. He sought to work closely with Co-ordinations to improve their links with research, actively fostering closer links between Chemicals Co-ordination and National Starch in research matters, as well as encouraging technical relationships with T.J. Lipton.[31] He supported the efforts of the Detergents Co-ordination to set up a central development unit to try to secure a faster pace of innovation -– Co-ordination reckoned at that date that it was taking Unilever seven years to get new ideas from the bench to the marketplace, far slower than competitors – though this encountered scepticism from the foods side concerned to maintain Unilever's contact with local markets.[32]

There remained considerable difficulty defining an overall research strategy even at the end of the 1980s.[33] Although the profitability and importance for Unilever of ice cream was growing from the mid-1980s, for example, research still consisted of a diverse range of many small local company-supported projects focused on the short term, and with little regard for a overall corporate strategy. A major ice cream research project –

'Voyager' – was initially launched in 1989 with five scientific teams of technical staff costing £750,000 per annum – supported by one junior marketeer. It was not until the following decade that real attempts began to be made to put resources behind more focused international projects.

Many internal reports compared Unilever's record unfavourably with that of its competitors. Nestlé seemed more effective at innovation because of the use of small research laboratories located close to markets. L'Oréal seemed to combine a long-standing commitment to innovation, shaped by a clear vision of the type of innovation it wanted to achieve, with a consistent set of core processes to generate this innovation. L'Oréal was noteworthy for combining a heavily scientific research programme with a concern for packaging design. P & G appeared able to use technology 'innovatively in new products', while in Unilever there was 'a tendency for technology to be held in reserve or used defensively to support existing brands'.[34] Such reports tended to see competitors through rose-tinted glasses – there were similar disappointments about the returns from research spending at P & G about the same time – yet their persistence indicated the level of dissatisfaction at Unilever about innovation.

During these years Unilever seemed better able to take a concept developed elsewhere, such as an expensive adult chocolate ice cream cone, and use its marketing capabilities to build a world-class brand, than to bring its own technological innovations to market quickly. There was a strong conviction within Unilever that the problem was the speed of application rather than the quality of the basic science.[35] There were in fact multiple problems. Unilever's managers were not especially technically oriented, and this

may have contributed to exaggerated expectations that scientific innovation would enable diversification into new product groups. Research was spread over a wide range of activities. Research in different product categories might have been better served by different organisational arrangements. In foods, a more local orientation might have stimulated innovation, while in detergents concentration of research resource was far more appropriate.

The problems caused by a fragmented organisation in which different product groups and functions knew comparatively little about each other, often competed for resources, and had little trust in one another, had to be addressed, but not necessarily by centrally imposed direction. Many studies of corporate innovation have concluded that finding the right balance between centralisation and decentralisation was at the heart of the organisational problems faced by firms. Too much of the former, in the words of one study, was 'likely to result in ambitious, radical and ill-conceived innovations', while too much of the latter was likely to result in 'incremental and safe innovations in established businesses'.[36] The tensions within Unilever concerning centralisation were reflected strongly in innovation strategies. Insofar as there was an 'innovation problem', it was part of wider problem. 'I wonder', Durham remarked during a special Board conference in 1981 which focused on the speed of innovation and the poor track record of creating new business opportunities, 'if the total reaction time of the whole business is much too slow'.[37]

The Research Laboratories

Unilever made a distinction between its central research laboratories – known as URL's after 1961 - and the numerous laboratories based in the operating companies. Until 1951 Port Sunlight had been the only 'central' research laboratory, but the following decade saw a rapid expansion of central research facilities. Colworth was opened in that year and Vlaardingen in 1956. In 1952 personal products research was transferred from Port Sunlight to Isleworth, which began a fully-fledged research centre in 1957. By 1970 Unilever was engaged in product development in nine central research laboratories in four European countries, as well as in over 20 'significant' laboratories - defined as costing over £100,000 per annum – located in European operating companies.[38] In addition, there were URLs in the US and India, and significant research and development was undertaken by the larger Overseas companies and T.J. Lipton.

As the era of optimism about the potential of science gave way to concerns about costs and getting marketable products, Unilever research began to be consolidated. In 1975 St Denis was reduced to a development laboratory, and closed altogether in 1980. In 1979 Welwyn and Isleworth were closed, and in the following year Duiven. In 1983 Hamburg also ceased to be a central research laboratory. This left Unilever Research in Europe again concentrated at Port Sunlight, Colworth and Vlaardingen.

Port Sunlight remained the largest laboratory in terms of numbers of scientists. At the end of the 1980s it employed the largest number of scientists – over 400 – compared to around 260 at Colworth and 290 at Vlaardingen. Port Sunlight was, and to a large extent remained, the home of soap and detergents research. After the postwar lag in synthetic detergents, a new division was created in 1950 separate from soap research,

with staff largely recruited from the edible oils section. Detergents became the core of the laboratory's work over the following decades. During the 1970s Port Sunlight was the research centre for fabrics research involving entry into the expanding medium temperature washing sector through TAED, and in 1985 the Port Sunlight Innovation Transfer Unit was established to provide a central resource to enable European companies to bring major new initiatives to markets in the shortest possible time.

Until the creation of Colworth, Port Sunlight undertook considerable foods research, including groundbreaking research on vitamins – Unilever was then the world's largest user of Vitamins A and D – and there was also research on low irritancy antiperspirants that could be applied by roll –on applications - until such personal care research was transferred to the laboratory at Isleworth in 1954. Following the latter's closure in the late 1970s, Port Sunlight resumed work in this area. In 1979 this research gave rise to a new generation of antiperspirant products based on activated aluminium chlorohydrate – which became established as the leading aerosol into the 21st century. During the 1980s Port Sunlight also took substantial work on gum health.

The lack of space at Port Sunlight led to a search for a new site in Britain, and in 1951 Colworth House was opened, located in the county of Bedfordshire, and designed to focus on research in foods. A high calibre staff was recruited. Colworth researchers pioneered the science behind dehydrated foods which resulted in the development of *Bachelor's* dried foods, *Vesta* meals and *Surprise Peas*. Research into citrate technology was patented in 1963 and led to the development of 'five minute soups'. Research on meat led to an important patent – the 'Algin Process' - which greatly improved the bacon curing process. Colworth also hosted the cloning unit working on oil palms, and a germ

unit which developed as a major research group immunology. Colworth also collaborated with T.J. Lipton in tea research. Flavoured leaf tea products with a storage life of twelve months were made possible by the development in the mid-1970s of tea particles (or prills), containing encapsulated volatile flowers, which could be blended with leaf tea. This enabled the stabilisation of flavours in tea bags, and the flavour prills formed the basis for the flavoured teas introduced in both the United States and Europe.[39] From the late 1970s Colworth, like the other research laboratories, came under pressure to fulfil more immediate product needs. Its researchers worked on the *Cornetto* soggy cone problem, and on developing softer ice creams.

Vlaardingen in the Netherlands attracted the largest share of the research budget of the three large European laboratories. The origins of the Dutch laboratory lay with a small group of workers based at Zwijndrecht where research centred on edible oils and vitamin research. By the late 1940s fifty people were employed. The subsequent opening of the new Vlaardingen laboratory in 1956 received considerable coverage in the Dutch press as an event of 'great national importance'.[40]

From the outset, Vlaardingen was strongly oriented towards basic research in biochemistry and nutrition in particular, and it came to be considered it amongst the best research laboratories of all Dutch companies.[41] The laboratory achieved early prominence through its work on margarine in response to the evidence that a high level of cholesterol was a risk factor for the development of heart diseases. Vlaardingen was at the forefront of the research that. underpinned the new health oriented margarine products. It developed collaborative links both with Dutch and foreign universities, with some staff holding academic posts as well. At the same time there was an important

cohort of researchers who worked on detergents, originating from the links with the food side of the business and the shared reliance on the raw materials of fatty acids and oils. While Port Sunlight was stronger in physical chemistry, Vlaardingen was stronger in biochemistry. Vlaardingen had the reputation of being the most 'academic' of Unilever's central research laboratories, sometimes attracting criticism in Britain that much of the research was too fundamental to be applied in the commercial world.[42]

Beyond Europe, Unilever's research laboratory in India became a major facility. The Hindustan Lever Research Laboratory in Bombay began in three rooms on the top floor of the engineering building of Hindustan Lever's factory. New buildings were opened in 1967, and by the end of the following decade the laboratory employed over 30 scientists and over 200 staff in total. There was, in contrast to the more general Unilever experience, a close co-ordination of activities between the research laboratory and the development laboratory at the Hindustan Lever factory, with the staff of the latter focused on more immediate problems and those of the R and D laboratory on longer-term projects.[43] Overall, the Bombay facility grew to become the second largest corporate research laboratory in India after that of the Swiss pharmaceuticals company, Ciba Geigy.[44]

The Indian laboratory became noteworthy for research on the use of indigenous materials. During the 1970s significant advances were made in the use of unconventional oils for soapmaking, including castor, of which India was the world's second largest producer, rice bran – a by-product of rice milling, and tree-borne oilseeds such as sal, kusum, neem and karanja. Each seed required a separate process to make it useful. Castor, for example, contained a fatty acid incompatible with soap making, but the laboratory

created the technology which altered its chemical structure to something resembling tallow and palm oil. This research enabled Hindustan Lever to continue to produce products even when import restrictions made supplies of raw materials uncertain, but by reducing imports of tallow and palm oil, it also contributed to considerable foreign exchange savings for the Indian economy as a whole.

. In the United States, Unilever opened a small laboratory already during the First World War. It developed *Rinso* in 1919, a granuated soap designed to reduce the time-consuming procedure of cutting bar soaps into chips for washing, and subsequently *Lux Toilet Soap*. When Lever's headquarters moved to New York in the early 1950s, a new Research Centre was constructed in Edgewater, New Jersey in 1952. A close interaction between research and marketing, encouraged by Lever's president between 1955 and 1964 who had formerly worked for P & G and had a strong technology orientation, resulted in considerable product innovation. During the late 1950s the laboratory came up with a series of noteworthy products including *Lux Liquid*, *Imperial Margarine*, *Wisk Heavy Duty Liquid Detergent*, and *Stripe* toothpaste. Teams of researchers innovated across product groups. The same inventors of *Mrs Butterworth's*, the clear table syrup which had butter in it, developed *Close-Up* toothpaste a decade later. Both products were based on the concept of matching an insoluble material with the refractive index of the medium.[45]

The integration of research and marketing achieved at Lever was illustrated by the development of the *Dove* bar, whose origins went back to research projects both at Port Sunlight and Edgewater in the 1950s designed to find a product which did not leave 'scum' after washing. The research at Port Sunlight was abandoned after the chemical

used was found to give an adverse dermatological reaction. However a different chemical was investigated at Edgewater which did not have this problem. Eventually it was found that a stable detergents bar could be made if stearic acid was added. Once the Lever marketing people learned that stearic acid was the same ingredient as used in cold creams, they rapidly conceived of the new product as something that 'creams as its cleans'. This became the basis of the immensely attractive brand, far removed from the original conception of an 'anti-scum' product. [46]

Edgewater's subsequent dwindling innovation performance reflected the overall problems of Lever Brothers. Lever's presidents were drawn from finance or marketing, and had less interest in long-term product development. Following a McKinsey report on improving the profitability of Lever Brothers in 1973, it was decided to cancel projects that would not impact on the company's profits within five years, and around 30 research staff were dismissed. This period also saw new laws on environmental and other matters which left the depleted Research staff scrambling to respond. Ingredients such as hexachlorophene and chloroform, which had been used in toothpastes were banning, forcing research to focus on finding substitutes. Whatever the reasons, the diminishing innovation performance at Edgewater contributed to Lever Brothers weakened competitiveness, and - given that the United States was so important a source of innovation in many products – to overall problems for Unilever. Detergents Co-ordination firmly believed that Unilever's continued reliance on Europe rather than the United States as its main centre of innovation was a considerable disadvantage.[47]

The radical steps taken by Unilever to renew its business in the United States from the late 1970s included a great expansion of the Edgewater facility. Staff were

transferred from Europe, and within a five-year period Lever research staff almost doubled. The period was fortuitous in the sense that the second oil shock led many large US companies such as Exxon to make a lot of staff redundant. Staff were recruited before the new buildings were ready, and then sent on secondment to Europe for a year during which they not only received training, but also became more aware of developments elsewhere in Unilever. In 1980 the laboratory was also placed under the control of Unilever Research.

The basic research undertaken at Unilever's laboratories led to the development of many new products, and enabled the constant improvements and reformulation which kept existing brands contemporary and competitive. The geographical spread of Unilever's central research facilities, which might be regarded as a dispersion of research resource, had the benefit of enabling Unilever to recruit scientists and link to academic networks in several different countries.

Innovation Failures: Yoghurt, Apollo Fabrics Wash and Hyacinth

Yoghurt

Unilever's entry into the European yoghurt market illustrated some of the problems of the innovation process within the firm. While yoghurt was already eaten in a number of European countries including the Netherlands before the 1960s, that decade saw a major expansion in yoghurt consumption in other countries such as Britain and Italy, where yoghurt had hardly been consumed previously. This growth was particularly associated with the introduction of fruit and flavoured varieties. In contrast in the

Netherlands most yoghurt was eaten plain and delivered by the milkman. Unilever was early to identify a business opportunity. Apart from a number of larger firms such as Gervais Danone and Chambourcy, the yoghurt sector was still dominated by a multitude of small firms – often dairies – in the late 1960s, yet it appeared susceptible to mass branding techniques.[48]

Unilever's best hope in yoghurt might have been the acquisition of one of the larger companies, but when Gervais Danone did come up for sale in the early 1970s, the proposal to buy it was blocked by the Special Committee.[49] This effectively signalled that it was not intended that Unilever would become a major participant in the industry. Instead a series of smaller companies were purchased, especially in France, which brought little expertise or market share, but which occupied considerable management time. Meanwhile considerable research spending was allocated to developing an appropriate product.

The decision to place yoghurt under the auspices of the Edible Foods Co-ordination rather than one of the other foods Co-ordinations had serious implications. The dairy business managed by the Co-ordination was an odd collection of small and medium-sized firms, some of which had been acquired as part of ice cream companies, and some set up in the large margarine operating companies, whose managements tended to see them as little more than a nuissance. The business was never allowed to grow to a size where economies of scale in production and distribution could be achieved. Within this Co-ordination, yoghurt was deemed to be important not because of the inherent qualities of the product or its consumers, but because it was usually located next to margarine in 'cool cabinet' of supermarkets. It was seen as essential to dominate the area

where the highly profitable margarine was sold. This drove the research effort which was focussed on developing a 'long life' product which could be sold in the 'cool cabinet', and in turn shaped how the product was conceptualised. A member of the Co-ordination advised companies seeking to enter the yoghurt market not to attempt to cater for 'existing yoghurt eaters… whose habits include half an hour of inversed perpendicular meditation before meals', but rather to appeal to traditional consumers of Unilever's 'tasty, fruity desserts and snack foods'.[50]

This strategy rested on a misunderstanding of the importance of health and freshness as factors in the growing consumption of yoghurt. Not only were long-life products the opposite of the popular image of yoghurt as fresh and natural, but Unilever knew this to be the case. In 1969 it was noted that 'we would never sell or advertise our products as keepable, even though they are and we like them to be because this permits more economic production and distribution. The consumer suspects a keepable fresh dairy product, and the trade might keep it in reserve stock for when the non-keepable private label is sold out'.[51] In other words, Unilever's strategy from the start was directed towards the development of a product whose principal characteristic had to be kept quiet from consumers.

Germany was chosen as the entry market, in part because Unilever had owned a processed cheese business in that country since the 1930s. Germany, like Britain, was also a market where the taste/shelflife combination was more likely to be accepted than in France or the Netherlands. After test marketing, the *Elite* brand of yoghurt was launched nationally in 1969 available in seven fruit varieties marketed by the margarine company UDL. In Britain Unilever launched a new brand, *Dessert Farm*. However by the mid-

1970s the yoghurt business was losing over £10 million annually, mainly in Germany and Britain.[52] By the end of the decade Unilever had almost entirely withdrawn from the business.

The failure in yoghurt had a number of causes. Longer life products were expensive because of the post-pasteurisation of yoghurt, while the more elaborate production process slowed down the ability to introduce new flavours and varieties. Yet the real problems stemmed from the focus on the cool cabinet strategy and the technical ability to produce longer life products rather than observing what consumers wanted and exploring ways it could be satisfied. Unilever Research delivered a series of innovations which extended the shelf life of fresh dairy products. Continuous improvements were achieved by in-line pasteurisation and sterilisation, aseptic filling and optimised cultures for long keepable live yoghurt. But the whole innovation process was technology-driven rather than market or consumer-led.

Apollo

The failure of *Apollo* in Germany suggested a similar lesson that product innovations introduced with little awareness for the market were unlikely to succeed. *Apollo* was a new fabric wash brand launched in Germany in a test market in February 1977; it was the first Unilever detergents product to contain TAED. By time it was introduced Unilever were a distant third in the German detergents market behind Henkel and P & G. *Apollo* lay at the heart of Unilever's plans for improving this position.[53] However the test market for *Apollo* failed, and by the end of 1978 the brand had been abandoned.

Apollo's failure was not the result of faulty background research or technical development. Although it took Unilever a long time to recognise the commercial opportunity offered by TAED, the research and development stages of the product process ran smoothly. Indeed there was a widespread conviction that Unilever had an important technological innovation. Even though the brand performed poorly in test market, perhaps because it had an unpleasant smell, the response from those who did actually buy it was positive. Co-ordination drew the conclusion that *Apollo*'s failure had been largely the result of poor advertising, and that it was a highly effective washing powder. [54]

The *Apollo* episode illustrated weaknesses across the range of the innovation process. It was launched into a mature market which not only meant that it faced stiff competition from major competitors, but that it was less than enthusiastically welcomed by the trade. Retailers had no need to encourage newcomers into a market already swollen with strong brands.[55] The supermarkets were reluctant either to display *Apollo* in the most prominent positions, or else to sell it at a discounted price. It had been envisaged that *Apollo* would become a leading brand that could be sold at a premium price, yet by the summer of 1977 it was recognised that *Apollo*'s price needed to be cut. However price-cutting seemed to result in consumers purchasing the product in bulk for one time, rather than serving any sampling role.[56]

There was a disconnect between technical accomplishment and marketing. It proved hard to explain to consumers why TAED was important enough for them to switch brands.[57] To launch an entirely new brand on the basis of TAED alone placed a huge amount of expectation on a single technical innovation, especially in a market

where competitor brands were so firmly established. The marketing of the brand was not facilitated by the fact that Lever Sunlicht could not spend heavily on advertising – it had to sharply reduce its media spending during the mid-1970s – and it already had the *Omo, Sunil* and *Korall* brands in the German fabrics market. Matters were further complicated by a difference of emphasis between the German company and Co-ordination. The former wanted to establish a clear brand identity in the German market by emphasising *Apollo's* ability to remove stains in low temperature washes. Detergents Co-ordination, with an eye on developing a new European-wide brand which could match P & G's *Ariel*, considered *Apollo* should aim to become a big volume seller on the basis of wider claims as a solution to main wash problems.[58] In Britain, environmental concerns were less pronounced than in Germany, and this may have led Detergents Co-ordination to see a low temperature wash as a narrowly 'specialist' position.[59]

Apollo provided a clear demonstration that a technical innovation was no guarantee of a successful new brand. The innovation needed to be communicated to consumers who had to be convinced that it satisfied a need. After the failure of *Apollo*, Unilever changed its strategy, and introduced TAED into existing brands. The most significant outcome of the *Apollo* episode was to sound the death knell for any hopes of developing a successful new European or international fabrics wash brand.

Hyacinth

The Hyacinth project to develop disposables, especially in feminine hygiene, was Unilever's most costly innovation failure in the 1970s. From the late 1960s Unilever had been interested in the disposables market. After the failed attempt to acquire Smith and Nephew in 1968, Unilever continued to search for another acquisition or partner given

that it had no expertise in this product category, but the search resulted in no suitable candidates.[60] Smith & Nephew – codenamed 'Hyacinth'– remained of interest, but Unilever was no further getting an acquisition.[61] However during 1973 a research group at Colworth – recently strengthened by the recruitment of distinguished academics from Edinburgh University – developed a novel polysaccharide based superabsorbent termed 'lyogel', which appeared to offer cost and other advantages over existing materials used for sanitary protection.[62] The technology involved complex chemistry, but the upshot was that Lyogel could absorb up to forty times its own weight in water, or twenty times its own weight in body fluids such as urine or blood. At the end of 1973, the Special Committee concluded that while 'every effort' needed to be made to find a partner with 'some experience', it would be 'worth going ahead' with product development based on Unilever's own innovation.[63]

By the mid-1970s research on Project Hyacinth – which took the name over from the proposed acquisition – was costing around £1 million a year. The Special Committee, which never considered Unilever had much chance of succeeding alone, watched with growing scepticism.[64] During the spring of 1975 Personal Products Co-ordination was instructed by the Special Committee to find an appropriate partner, or else abandon the project, and meanwhile to cut the expenditure on Hyacinth research by a half.[65] The budget cut was accomplished by abandoning research into nappies, not least because it emerged that the new gel absorbed the urine from babies at a slow pace, and did not spread it evenly. Unilever was unable to use a sponge in conjunction with its gel to speed up the absorption process because P & G already had a patent for this. Thereafter the Hyacinth research focused on sanitary towels and tampons. These were difficult markets

as there were strong incumbents. Tampax held dominant positions in many countries – holding 80 per cent of the British tampon market in the mid-1970s – while Smith & Nephew held 70 per cent of the British sanitary towel market. Women were cautious and conservative consumers of such intimate products, which meant that Unilever had no chance of successful entry without a major advantage.

No partner was found, but nor was the project discontinued. The case for continuing was that so much time and money had been spent establishing a technological advantage that Unilever should persist with trying to get a commercial product.[66] During 1976 Co-ordination secured permission for Elida Gibbs to launch products in Britain, but there were technical delays and difficulties manufacturing the gel. Although the Special Committee had authorised a small pilot plant to make the gel, this did not prove feasible, and for reasons of economies of scale Co-ordination went ahead with building new plant inside a personal products factory in Brussels – chosen because effluent regulations were lower than elsewhere at the time - to manufacture the gel, and supply it to factories in Britain and Germany which were to make the sanitary towels. The Special Committee was 'surprised to find that the project seemed to have expanded considerably'.[67] In fact, if Unilever was to have made a serious entry into the market, a much larger capital investment would have been required.

During 1977 the *Finesse* brand of sanitary towels was test marketed in three British towns in preparation for a national launch in 1980, and in 1978 *Cosmea* was launched in nationally in Austria, which was intended as a test market for Germany. By then other superabsorbent towels were already in the market, although Unilever gained a 10 per cent market share in Austria within six months. However *Cosmea* ran into

problems when it was launched in Germany two years later, as the market leader in sanitary towels took legal action claiming Unilever advertising was untrue

During 1980 the Hyacinth Project reached its nemesis. The planned national launch in Britain was delayed for a year with continuing supply problems.[68] P & G's *Rely* tampon, a super absorbent product which had been the result of a large research effort and was intended by the US company as its next blockbuster product, became the centre of a major controversy after it was linked to several deaths in the United States through 'toxic shock syndrome'. Unilever watched the *Rely* episode unfold with alarm, but it was its own accumulating production and launch problems which finally ended the Hyacinth Project. There were supply problems as sales increased, and then a decision was taken to close the Belgian factory where the Lyogel was made. It was regarded as too expensive to build another plant elsewhere. Co-ordination decided to replace Lyogel with an alternative super-absorbent material called Permasorb made by National Starch. The Special Committee declared itself 'very disturbed' that 'the fact that we were now going to use a material which was equally available to any of the competition meant that we no longer had any technical advantage whatsoever'. The decision was taken to close the business.[69]

The total financial cost of research, capital expenditure and marketing for the Hyacinth Project seems to have been at least £15 million over the course of the 1970s, in return for which Unilever failed to establish a disposables business. The episode was widely interpreted as demonstrating that hopes of achieving diversification into new product categories on the basis of research were at best exaggerated.[70] This led to a strengthening of resistance to research led innovation in areas that lay outside the

Unilever's mainstream markets, and a strengthening of critics calling for major reforms in the speed and control of Unilever research. The project could also be interpreted as showing Unilever as being slow in bringing innovations to the market and, when it did, reluctant to make very big investments supporting them. However perhaps the most serious failure concerned the role of the Special Committee, which exerted its authority too late, after large funds had been committed. The Hyacinth case in particular revealed one major problem in Unilever's processes was that the Special Committee exerted its authority far too late, after substantial funds had been spent. They were kept informed of Hyacinth, but lacked either the willingness or ability to cancel it, despite constantly expressing the view that Unilever did not have the resources to make a success of this product category by itself.

The above cases of unsuccessful innovation do not demonstrate deficiencies in scientific research. Researchers delivered a 'keepable' yoghurt, TAED was an important innovation in fabric wash, and Lyogel was a considerable scientific achievement. The problems arose because this research was not integrated into an innovation process. The commercial exploitation of technical innovations was pursued with little regard to the marketplace. Consumers did not want longer life yoghurts, especially if they did not taste as good as fresh ones. Nor did German consumers want another detergents brand whose novelty was hard to explain. Female consumers might have responded to a much more efficient form of sanitary protection, but the market already had tried and trusted brands, and by the time Unilever got any products on sale similar techno logies were available and already coming under question. While the Special Committee's ability to influence a

projects outcome was greatest at the earliest stage of development, at Unilever they tended to become involved only later in the project, when it was heading for trouble.

Innovation Success: Cif/Jif, Viennetta, and Clearblue

CifJif

The interaction between technological innovation, marketing and consumer demand which made for a successful innovation can be seen in the development of *Cif/Jif,* first liquid abrasive cleaner product of its kind. During the post-war decades there was a growing demand for household cleaners as numerous new houses were built in Europe with fitted kitchens and bathrooms, and as demand grew for labour saving means of cleaning them. They had new enamel, formica or stainless steel surfaces. The development of abrasive cleaners such as Unilever's *Vim* and Colgate's *Ajax,* which were powdered scourers, made the removal of stains from hard surfaces much easier. There was also a range of non-abrasive liquid or spray cleaners, with more 'user friendly' designs and packaging, including Unilever's *Handy Andy* in UK. Sales of the latter products grew rapidly from the late 1960s, even though abrasive cleaners remained the largest segment of the market.[71] It co-incided with a growing interest not only with cleaning surfaces, but with preserving their original qualities, which abrasives might damage through scratching.

From the late 1950s scientists at Port Sunlight were working on the technology of suspending mineral particles in liquids. Although the basic concept was invented in those years, there were considerable problems manufacturing a stable product. Eventually Lever France decided to take up the research, and began to explore empirical solutions to

the problems in the early 1960s, though the extreme sensitivity to raw material and processing specifications remained. Finally after more development work a new product – *Cif* - was launched in France in 1965. The original *Cif l*iquid formulation contained particles of silicate, a hard substance that was used in powdered scourers to break down particularly tough dirt or stains. *Cif* offered, therefore, a product which was not only just as effective as traditional scourers at removing dirt, but which was also had the added convenience of being a liquid. It was hoped that *Cif* would benefit from the rapid growth in the market for liquid cleaners, but also take market share away from scouring powders, which in France – and many other countries - were dominated by Colgate's *Ajax*.

When first launched *Cif* was not a great success, however, and its sales steadily declined through to 1968.[72] The problem lay in marketing and especially the original brand image. As the formulation contained the same abrasive mineral substance that was used in scouring powders, the only added value *Cif* offered was that it was a liquid, but this did not really justify the considerable premium it was sold at over other scouring powders. Rather than being sold and marketed as a liquid cleaner that was more effective than other non-abrasive products, *Cif* was presented as an abrasive detergent which just happened to be liquid. Furthermore, by selling *Cif* in packs similar to other scourers, the price differential was emphasised. Meanwhile no other Unilever company wanted to take up the product concept at all. Woodroofe was informed by Detergents Co-ordination that there was insufficient stainless steel in European kitchens for the product to be successful.[73]

It was not until the French company changed the formula, packaging and advertising in 1969 that *Cif* began to succeed. The fundamental difference was that the

new *Cif* contained a mineral known as calcite rather than silicate. Whereas silicate had a tendency to scratch enamel or stainless steel surfaces, calcite, which was softer, did not. This gave *Cif* a clear advantage over scouring powders in its ability to clean without damaging expensive surfaces. The re-launch of *Cif* involved a two-pronged marketing strategy which highlighted both the propensity of scouring powders to cause scratching, and the ability of *Cif* to leave surfaces shining clean and scratch free.

The new brand message was conveyed through a series of television and radio adverts in France involving an ice skater beginning in January 1970. The core images involved showing a dirty surface being cleaned by a scourer, followed by an ice skater scratching the ice, followed by a 'smooth and elegant' demonstration of *Cif* cleaning a surface. The guidelines for the television commercial specified a final shot of 'a graceful woman's hand stroking down the bottle and slowly running a finger along the ice (to add) 'a touch of femininity and gentleness and (lend) further proof to the clean result.'[74]

This advertising campaign provided *Cif* with a clear market position that distinguished it from other scourers other than just its liquidity, and justified its price premium. The brand was firmly established as one that could be used on enamel surfaces throughout the house suggesting it was not just a speciality item. The benefit to the consumer in using *Cif* was effectively communicated through the novelty value of the 'skater' advertising campaign which closely matched the innovative nature of the product itself. This advertising strategy was suitable for most markets, and it soon became an internationally recognised campaign. After proving a success in France, the ice-skater theme was used to advertise *Cif* – or *Jif* as it was called in Britain and the Netherlands – in many other European countries.

A further important difference between the original 1965 *Cif*, and the re-launched 1969 *Cif* was its packaging. Significant changes were made to the shape, colour and size of bottles. *Cif* was originally sold in cylindrical containers, which were similar in appearance to the cylinders in which *Ajax* was packaged. After considerable market research, the re-launch saw great changes. The new bottles were flat, which distinguished them from scouring powders. They were opaque, which was in contrast to most all-purpose cleaners which came in transparent bottles. They were white, 'to establish a relationship between *Cif* and white enamel'. Finally a green 'tornado motif' logotype helped to 'evoke efficiency and ammonia'.[75]

Once established and rolled out in Europe, Unilever's research laboratories worked to enhance the technical properties of *Cif.* During the 1970s researchers at Port Sunlight made further improvements in the calcite abrasive that enhanced convenience in use by leaving less deposits. Studies of the abrasive properties of calcite from different sources opened up alternative local supplies which reduced costs. *Jif*-with-bleach was launched in the Netherlands in the late 1970s, while Lever Brothers in Britain developed a zero phosphate version of the brand.

Cif/Jif was a successful innovation which established a new international brand based on new research. It was a high quality product which offered consumers a noticeable benefit, for which a premium price could be charged. Although the development process took quite a number of years, Unilever was still first into the market, and faced no direct competition until the launch in France of *Ajax Cremé* at the end of 1973. The way the brand was developed demonstrated the benefits from a close interaction between the research of the central research laboratories and product

development, marketing and branding. However the origins of *Cif/Jif* also showed the somewhat ad hoc nature of how research concepts were transferred from researchers to the market, for it was fortuitous that the French company decided to take up the research and develop it.

Viennetta

Viennetta was also a successful innovation, although of a different type than *Cif/Jif.* The *Viennetta* ice cream gateaux, launched first in Britain as a Christmas speciality in 1982, represented a new concept of a branded ice cream dessert. Its origins lay in 1980 when Wall's product development manager in Britain was browsing through a cookbook he had given his wife for Christmas, and saw an illustration of the French recipe for *millefeuille* cake. He suddenly had a vision not of a 'thousand thin leaves' of puff pastry filled with cream and jam, but a cake consisting of layers of ice cream alternated with strata of chocolate.[76]

The new product was essentially a conceptual innovation. It was not a new type of ice cream, but led to ice cream being consumed in a different way. Instead of ice cream being served as an accompaniment to something else, it became a complete dessert in itself. It thereby opened up a whole new market sector that could be branded and marketed much more distinctively. There was limited scientific innovation behind *Viennetta.* The ice cream was adapted from Unilever's recipe for *Cornetto* in Belgium, while the packaging for the product was largely based on log packaging used by Langnese in Germany.[77] The main technical obstacle that needed to be overcome lay in

the production process. A method was devised for the manufacture of this delicate and multi-layered product and the process was patented, which proved highly significant, as Unilever was able to use it to prevent other competitors developing imitations. Subsequently Unilever was able to take or threaten legal action against imitation products which allegedly breached the *Viennetta* patent. [78]

When *Viennetta* was first launched in Britain, it was initially regarded as a festive novelty. It was not planned as an all-year-round take-home ice cream dessert, and only became one after sales expectations were exceeded. [79] It was priced at less than other 'luxury' desserts, and it was not supported with a national television advertising campaign. Only when it became apparent that the product was exceeding expectations was a regional advertising campaign devised. The initial response was dramatic, and it was eventually extended nationally, almost a year after *Viennetta* was first launched.

Advertising played a critical role in *Viennetta's* success. The campaign in Britain was entitled the 'last slice'. The main advertisement showed the guests at an upscale dinner table coveting the final helping of dessert. One of the key features of the commercial was the close-up shot of the *Viennetta* being sliced, and the knife slowly cutting through the many thin layers of chocolate and ice cream.[80] This achieved a high rate of consumer response. When the product was first launched with little advertising support in the Netherlands and Belgium in 1983 it failed, but when it was re-launched in the following year with strong marketing support, it also proved a resounding success.

Viennetta became an example of what could be achieved with an innovative new brand. Rather than competing with other manufacturers for shelf space in supermarkets, it was the supermarkets themselves that fought to sell *Viennetta* at competitive prices.

Having been launched in 1982, the price to the retailer for *Viennetta* was increased steadily on an annual basis, while retailers competed in the prices they charged to consumers as the product became more and more popular. The low retail price – initially 89 pence in Britain – helped to maintain high volume, but it was retailers rather than manufacturers who trimmed their margins.[81] *Viennetta* was an affordable luxury that could be consumed by a spectrum of income groups, which made it ideal for supermarkets.

Clearblue

Unilever's development of a new business in medical diagnostics, of which the *Clearblue* pregnancy test kit was the most important product, was the culmination of scientific research and accumulated knowledge on immunology over more than a decade. The science on which this new business was based had a long pedigree with Unilever stretching back to immunological research conducted at Colworth from the 1960s in relation to animal feeds, and especially the post-weaning diarrhoea in piglets. This led to a dry feed product launched as *Intragen* in 1975, which earned Colworth considerable international scientific credibility, although a reluctance to venture into pharmaceuticals may have accounted for a reluctance to develop the research into further areas. [82]

UAC had also diversified into medical products during the early 1970s. Its Medical Division launched *Sensititre* in 1978. This was a disposable antibiotic disc for use in hospitals or doctors surgeries for rapid identification of bacterial infections as an aid to diagnosis. [83] The immunology laboratory at Colworth assisted UAC, and collaborative links were also formed with Birmingham University that led, in 1978, to the launch of the *Immunostics* range of antibody products. Immunodiagnostic research

continued at Colworth, and the science that underpinned *Immunostics* was applied in the development of a number of systems, including most notably, the 'dipstick' concept - a simple one-step, assay system whose basic principles were subsequently employed in *Clearblue.* [84]

Meanwhile Colworth had also built on the discovery by Cambridge scientists in 1975 of monoclonal antibodies – molecules that recognise only one type of antigen and therefore can be used to target a defined antigen – and in 1980 filed the Paired Monoclonal Antibody (PMA) patent, which protected the ground-breaking technique of using two monoclonals of narrow and different specificity to bind different sites of an antigen. This science had a number of possible uses, and by the early 1980s the Colworth researchers were already considering its use in pregnancy testing. [85]

By 1980 Unilever was at the forefront of the science of immunochemistry, but the achievement seemed fated to join the catalogue of unfilled potential seen elsewhere. There were increasing doubts about the competence of UAC to pursue a medical business, and its proposed acquisitions in this field in the United States were blocked by the Special Committee. The *Sensititre* business was eventually sold to its American distributor after Unilever had failed to exploit its early lead. [86] The decision to close down the Animal Foods Co-ordination in 1982 also led to a decline in funding for immunological research. [87]

However Unilever's immunological research had impressed both the Research Director and Chemicals Co-ordination. [88] In 1982 a decision was made to take the medical diagnostics business out of UAC, and placed it under a new Medical Products Group within the Chemicals Co-ordination. Given that the established formula of using

CRF funds to undertake basic research which would then be taken over by the relevant Co-ordination was not applicable, it was decided to provide funds from central Unilever sources. The Special Committee acknowledged that, from its inception, Medical Products Group would be making losses for three to four years while building up 'necessary' knowledge.[89] This structure provided Medical Products Group with direct access to the higher levels of Unilever and secure financial support. Meanwhile new managers were recruited from other firms, including Beechams and Glaxo, and a small new R & D group was set up in a converted warehouse in Bedfordshire near Colworth. UAC's Sewards laboratory was incorporated into the new Bedford laboratory, and the medical diagnostics business relaunched as a new company, Unipath, formed in 1983. [90]

By 1984 the strategy was 'to build a reputation as an advanced technology group with quality products'.[91] Research was pursued in a number of directions jointly with leading universities and medical institutes, with great interest in the application of monoclonal antibodies in the treatment of cancer. However it was soon decided that the business needed one major commercial product within a year, or otherwise it 'would become our research boutique unless we related ourselves to the marketplace.'[92] In the belief that there would be a future shift in the diagnostics market to consumer homes, research was refocused on products designed for the Over The Counter (OTC) consumer market. Pregnancy testing became the focus of attention at Unipath.

A concerted research and marketing effort led in June 1985 to the launch of a new pregnancy testing kit *Clearblue* through pharmaceutical outlets in Britain. OTC pregnancy tests existed prior to *Clearblue*'s launch, and the research was focused on developing a product that offered distinct advantages over the competition. Home use

dictated a need for easy to use systems which were sensitive, fast and reliable. After consumer research identified the 'particular distaste' of consumers for taking a urine sample,[93] a unique 'bucket' collection system was devised that was hygienic and non-invasive. A test result was obtained within 30 minutes. Expertise from Unilever's food packaging businesses was employed to improve the packaging and attain a shelf life of six months.

The Unipath marketing team comprised a sales team of specially recruited science graduates, which remained separate from Unilever marketing generally. This provided the basis for a close technical/marketing interface.[94] *Clearblue* was carefully positioned in order to create a 'niche market'; it was strategically targeted towards the modern independent woman in control of her life and the 'discovery' of pregnancy. Advertising often pictured a woman – in soft focus and in a private space - usually the bathroom – consulting the test outcome alone. A strong brand image was also developed: the launch 'involved extensive product support' which, for example, included the creation of a distinctive 'Fan Device' trademark which sought to convey reassurance and suggest femininity. The product was launched rapidly elsewhere in Europe and in the United States mainly through third party distributors.

The success of *Clearblue* led to a range of OTC kits. During 1988 *Clearblue One Step* – or *Clearblue Easy* was it was known in the United States - was launched as the first pregnancy test kit to use PMA technology, which incorporated a porous nitro-cellulose membrane built into a 'one-pot' system which eradicated the 'wash and wait' stages of previous kits. The *Clearblue One Step* test gave a result within three minutes. The product rapidly gained 50 per cent of the British market, and became a world leader

following its introduction elsewhere in Europe and the United States. PMA and the dipstick system provided the basis for several other products, including *Clearplan*, a home ovulation test launched in 1989.

By 1990 medical products was a profitable, but very small product category, with a mere 0.3 per cent of the Unilever's total sales. However the way *Clearblue* had been developed outside the conventional Unilever structures was instructive. The patronage of several directors was essential to fostering this research area, but there was more to its success. Unipath also developed a highly innovative culture, with a strong emphasis on clear and open channels of communication, which differed sharply from the culture found so often elsewhere in Unilever. There was a higher level of risk acceptance, and a willingness to tolerate and recover from failure. A research programme on fertility monitoring – 'Project Frog' – undertaken with Elida Gibbs was abandoned after it appeared the technology and the market were not ready, but without any of the concern for sunk costs and recriminations seen in Project Hyacinth. There was also a striking interaction between the technology and the market, enabling Unilever to translate research into a brand that found success in the marketplace, and build a wholly new business in the process. [95]

In the cases of *Cif/Jif*, *Viennetta* and *Clearblue* the interfaces between research, development, production and marketing in the innovation process were smooth. In the example of *Cif/Jif,* Unilever's French company took up the basic research developed at Port Sunlight, and developed a formulation and image close to the market. *Viennetta* was developed within one operating company that got the concept right, and discovered an

attractive product. While *Clearblue* was based on a basic research, the branded product was developed by the new Unipath company which escaped the friction between functions so often seen within Unilever. It served as the kind of 'cradle company' that Woodroofe had contemplated in the late 1950s.

All three cases were examples of innovations in 'concepts'. *Jif/Cif* was both an abrasive cleaner and a 'liquid cleaner'. *Viennetta* was both an ice cream and a dessert. *Clearblue* was an efficient pregnancy test product, but the underlying concept was of giving women more control over their lives. As consumers became more affluent and discerning, and faced a growing range of choices, opportunities for successful innovation were found more often in new concepts than in inventing new products narrowly defined. The problem for Unilever was that the discovery of such new concepts was likely to emerge from a holistic understanding of both the possibilities of scientific and technological research and of the nature of the marketplace

Unilever and Innovation

Unilever possessed an impressive science base. Almost certainly no other large company in the world conducted over a 25-year period such a wide spread of research spanning not only detergents, household cleaners, toothpaste, deodorants and all kinds of foodstuffs, but also chemicals, palm oil cloning, animal vaccines, sanitary towels, and pregnancy tests. Unilever research developed an international reputation for excellence.

The problem was that this research too often did not deliver commercial results commensurate with the scale of resource devoted to it. It seemed to take a long time to turn a scientific innovation into a commercial product. The contribution of scientific research to renewing and building the margarine business was a major exception, but in

detergents and foods, industries with strong international competitors, Unilever too often moved more slowly. Unilever's problems in new product and process development were not unique amongst large corporations, but there was a long term dissatisfaction among executives that its performance was weaker than its major international competitors.

From the 1950s Unilever sought to leverage its research capabilities by providing more central direction. This was rational in such a decentralised organisation where the strategic exploitation of science might otherwise have been undermined by duplication of effort. However the central direction of research led Unilever into unsuccessful innovations, such as long life yoghurt and feminine hygiene, where too little attention was given to the needs of the market. The view that if Unilever had a good scientific or technological innovation, it had the capability to translate it into success in the marketplace lingered, even though consumers increasingly had more choices and a higher level of sophistication in making them. It was significant that successful innovations such as *Jif/Cif* and *Viennetta* were characterised by being developed and refined close to one market. They also began on a small -scale. It was not Unilever's approach to make huge P & G-style investments in new innovations which might radically change consumer demand.

The innovation process had to steer a course through the Research Division, the research laboratories, Co-ordinations, operating companies, and the Special Committee. There were structural constraints on successful innovation in the ways that Unilever was organised both horizontally – between Co-ordinations and Research – and vertically – between Research and operating companies. This constellation acted as a 'closed system' given the distrust of collaborative ventures with other firms, which meant little effort was

made to tap into outside sources of technology available from, for instance, larger suppliers. The identification of priorities was complex in such a diversified firm, but they became hazardous given the lack of communication between research, development, manufacturing and marketing. The Special Committee intervened too late in the whole process, after problems had arisen, rather than at the crucial starting point of projects.

There was a wider issue of corporate culture. One authority on 'innovative firms' has the norms which appear to assist the development and commercialisation of new products and processes. These include 'the autonomy to try and fail; the right of employees to challenge the status quo; open communication to customers, to external sources of technology and within the firm itself. With respect to commercialisation or implementation, teamwork, flexibility, trust and hard work'.[96] Unilever's culture did not closely fit these characteristics. The 'solution' to the 'innovation problem' involved confronting the cultural and organisational legacy of Unilever. It was easier to build a small innovative entity such as Unipath relatively isolated from the mainstream organisation than to transform the entire company. Unilever began the 1990s still searching for solutions to the perceived deficiencies in its innovative capabilities.

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