

PHILIPS ORAL HEALTHCARE (A): INTENSIFYING COMPETITION, ESCALATING PERFORMANCE DEMANDS

Professor Ron Sanchez prepared this case as a basis for class discussion rather than to illustrate either effective or ineffective handling of a business situation.

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Beginning in the 1990s, growing concern among consumers for good health and personal appearance stimulated significant growth in global demand for Oral Healthcare products and services. By the late 1990s, managers in the Oral Healthcare business unit of Philips Domestic Appliances and Personal Care products division (known within Philips as “DAP”) were convinced that the growth in global demand for Oral Healthcare products such as Philips electric toothbrushes would be sustained for many years to come. They also saw the demand for electric toothbrushes in particular as a market in which DAP could leverage its considerable competence in the design,¹ manufacture, and marketing of precision personal care products.

In the early 1990s, Philips had introduced a new series of electric toothbrush designs in an effort to win market share from Braun, the market leader with over 50% market share in Europe and 40% market share in the United States in 1994.² Competition between Philips, Braun, Interplak, and a number of smaller producers of electric toothbrushes intensified in the mid to late 1990s on a number of dimensions--price, product performance, and responsiveness of the supply chain to the increasing demands of distribution channels for greater speed and delivery of more customized products. By 1999, intensifying competition and escalating demands for superior performance on all three competitive dimensions challenged Philips Oral Healthcare managers to find a new way to compete in the electric toothbrush business. From Philips’ long experience in intensely competitive markets like consumer electronics, Philips Oral Healthcare managers knew that failing to keep pace with the rapidly rising customer demands and competition levels in the electric toothbrush business could quickly force a strategically undesirable exit from the market.

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¹ Philips DAP also produces electric shavers for men and women, beard trimmers, depilators (for removing unwanted hair), and related personal care products. DAP holds major shares of the global markets for each of these product categories.

² For further background on the electric toothbrush market and on Philips product initiatives in the early to mid-1990s, see “Philips and the Oral Healthcare Challenge (A)” and “Philips and the Oral Healthcare Challenge (B),” IMD cases IMD-3-0702 and IMD-3-0703 respectively, by Professor Jean-Philippe Deschamps.

The Market for Electric Toothbrushes

As consumers' health consciousness and disposable incomes grew in the developed economies of the world in the 1980s and 1990s, demand for products and services to maintain good oral health increased strongly. Traditionally, the market for Oral Healthcare consisted of services provided by Oral Healthcare professionals (dentists, orthodontists, etc.) and a range of consumable Oral Healthcare products such as toothbrushes, toothpaste, dental floss, and mouthwash. A full range of consumable Oral Healthcare products was widely distributed through drug stores and supermarkets in most countries of the world.

In the 1980s, a durable product for home Oral Healthcare--the electric toothbrush--began to gain professional and consumer acceptance. A rechargeable electric toothbrush introduced by Interplak was the first to demonstrate scientifically that electric toothbrushing could significantly improve oral hygiene. As consumer interest in the Oral Healthcare benefits of electric toothbrushes began to grow in the 1980s, Interplak gained more than 50% (by units sold) of the electric toothbrush market in the United States. Building on an apparently underserved consumer concern for improved oral health, Braun developed an electric toothbrush design with significant cleaning improvements that were established through extensive clinical tests in the late 1980s through early 1990s. On the strength of these tests, Braun obtained the American Dental Association's "Seal of Approval" for its toothbrushes and intensively promoted this important professional endorsement in its marketing. In the early 1990s, Braun's D5 and D7 electric toothbrushes dominated the global electric toothbrush market and gave Braun the leading market share in Europe.

In the same period, Sonicare, a Seattle-based US company developed and marketed an innovative high-speed "sonic-action" toothbrush, which was sold exclusively through dentists' offices. On the strength of the superior cleaning capabilities made possible by its advanced technology, by early 1990 Sonicare established a dominant position in the high performance end of the electric toothbrush market in North America.

Based largely on the superior cleaning action of electric toothbrushes in removing plaque and stimulating gums, by the late 1990s the global market for electric toothbrushes was estimated at 15 million units annually. Priced at retail from approximately US\$15 to US\$100, electric toothbrushes generate retail sales of several hundred million dollars annually.³ Moreover, global demand for electric toothbrushes grew 10% to 15% annually in the 1990s. Given the substantial size and growth rate of this market, a number of major consumer electrical products companies had entered the market or expanded their presence in the market, including Matsushita in Japan and Philips in Europe.

Producers of electric toothbrushes seek to differentiate their brands largely on the basis of technical variations in brush tip designs and cleaning motions, and the specific Oral Healthcare benefits claimed to result from each producer's distinctive combination of brush tip design and cleaning motion. Brush tip designs differed by

³ From *Philips and the Oral Healthcare Challenge (A)*, case IMD-3-0702 (v. 16-02-2001), IMD, Lausanne, Switzerland.

bristle length, stiffness, thickness, tip treatments, and colors, as well as tufting patterns and cuts. Philips, for example, forged an alliance with Jordan, a leading manual toothbrush maker in Europe recognized for its bristle technology, to offer brush tips with bristles that were specially designed and manufactured by Jordan to work well with the brushing action of Philips' toothbrushes. Brush tip motions differed in their three-dimensional brush tip trajectory and the frequency (cycles per minute) with which the brush tip moved through the trajectory. Even two-part brush tips with independent dual movements have been introduced to the market.

Featuring not directly related to brush tip design and motion is also a basis of competition, such as battery charge indicator lights, convenient designs for storage and charger units, and compact travel brush sets. Styling changes were also introduced periodically to refresh product lines and stimulate new purchases.

By 2000, approximately 40% of global sales of electric toothbrushes were generated in the North American market, 40% in Europe, and most of the remaining 20% in Japan and the developed economies of Asia. The estimated market shares (based on sales) for the major producers in the Triad regions in 2001 were as follows: In Europe, Braun held 70% and Philips 17%. In North America, Braun held 51% and Philips 42% (including the Sonicare brand). In Asia/Pacific, Braun held 32%, Philips 30%, and Matsushita's National brand 27%.

Lower-priced electric toothbrushes are sold primarily through discount stores and drug store chains, mid-range toothbrushes through department stores and pharmacies, and the up-market Sonicare toothbrushes through dentists' offices and premium retail outlets. For the relative few competitors with strong global brands and access to the mainstream distribution channels in the early 1990s, the market for electric toothbrushes was characterized as "highly profitable."

New Competitive Dynamics

In the late 1990s, new competitive dynamics began to reshape competition between the major players in the electric toothbrush market. As electric toothbrushes became mainstream consumer products, growing consumer demand made it possible for a major producer to achieve significant economies of scale by increasing production volumes. Both price-cutting to capture greater share of the existing market and the introduction of low-priced models to build new down-market demand became prominent features of the competitive environment. In addition, more models were continually brought to market, typically distinguished by various combinations and levels of featuring and by packaging variations (e.g., packaging with extra replacement brushes).

At the same time, price points were steadily declining, as models in all price ranges were subject to continuing price erosion. *Exhibit 1* shows, for example, the growing importance of lower-priced models and the overall decline in retail prices in the European market for electric toothbrushes between 1996 and 1999. As a result of this strong price erosion, the costs of production and delivery required to compete profitably were rapidly falling in all price categories as price points steadily drifted downward.

As falling prices and increased featuring put margins on the sales of new electric toothbrushes under growing pressure, sales of replacement brushes became the major source of profits in the electric toothbrush business. Each major producer sought--with considerable success--to create a captive market for replacement brushes by creating unique mechanical interfaces between its brush tips and the powered handle unit that the brush tip attaches to, and by patenting various features of its brush tip designs. By the late 1990s, competition in the electric toothbrush business had in important respects become a fight to build up the “installed base” of each producer’s brand of electric toothbrush to assure long-term demand for replacement brushes. The fight to build installed base further fueled price competition and efforts to build up every possible avenue of distribution.

The consolidation and globalization of retailing that swept the USA and Europe in the 1990s also had a profound impact on the electric toothbrush market. Discount chains like Wal-Mart in North America and Carrefour in Europe became increasingly important global retailers of electric toothbrushes. These retailers began to demand product models with exclusive packaging and even distinctive handle colors. Some retailers also asked for models with fewer features that could be sold at low prices and in large volumes.

Sales to these large retailers were mostly “deal-driven.” Large retailers increasingly asked for what became known within Philips as “special deals.” Typically, these were large orders for basic models at reduced prices, or sometimes for special packaging with extra brush tips or bonus accessories to be sold at the same price points as standard packages of products. Special deals generally involved large quantities--often between 50,000 and 200,000 units--and were usually to be delivered within 8 to 12 weeks. In some cases, special deals were accepted by producers at very low margins or even at losses, which were often justified as an essential way of investing in building the distribution relationship with large retailers. Thus, to maintain market share, major producers had to find ways to provide a growing range of product models and packaging variations to the large retailers as well as to other channels, and to do so at steadily falling unit prices.

Philips Oral Healthcare’s Electric Toothbrush Business

Development and production for Philips’ Oral Healthcare business unit was based at DAP’s HGW (“Haushaltsgeratewerk”) facility in Klagenfurt, Austria. DAP Klagenfurt had been engaged in developing and producing several personal care products for a number of years, including Philips LadyShave shavers for women, Satinelle epilators for hair removal, and a range of Philips-branded beard trimmers and hair clippers for men.

Philips’ initial line of electric toothbrush products included three models of its distinctive “2-action” brush-motion design--HP 510, HP 710, and HP 735, which were known internally as the “Trident” range. Initial models were co-branded as Philips and Jordan, largely because of Jordan’s good reputation as a manual toothbrush maker in Europe. Beginning in the second quarter of 1999, however, the co-branding and brush supply arrangement with Jordan was discontinued, and Philips electric toothbrushes were re-introduced under the “Sensiflex” product brand.

The new Philips Sensiflex line (internally known as the “Fighter” range for its mission of fighting against Braun’s dominant market position) included a moderately priced 1000 series of electric toothbrushes (HX1520E and HX1525E), a mid-priced 2000 series providing improved plaque removal (HX2520E, HX2540E, and HX2550E), a waterjet unit for cleaning between teeth and around gums (HX2220), and a dental center (HX2740DC) that offered a combination of a 2000 series electric toothbrush and a waterjet (*refer to Exhibit 2*). Nevertheless, despite the breadth of the Sensiflex product line, the rate of market penetration and the profitability levels achieved by Philips’ electric toothbrushes was not at the level desired by DAP Oral Healthcare management the end of 1999.

Philips sought to develop a number of distribution channels, both traditional and new, to build volume. Traditional marketing and distribution channels used by Philips included department stores, small appliance shops (which were usually organized into purchasing groups to increase their purchasing power), pharmacies, and dentists. Newer channels developed by Philips included large retailers like Carrefour, direct marketing, and Internet marketing. In addition, “mixed merchandise” European discount retailers like Aldi and Albert Heijn that offered a changing selection of attractively priced products frequently bought large lots of inexpensive models. Lower-priced models that could be sold in large volumes by such retailers came to be known within Philips as “Fast-Moving Consumer Goods,” or FMCG. By the late 1990s, the volume of Philips toothbrushes moving through the large retailers and the FMCG channels was growing strongly relative to the volume moving through traditional distribution channels.

By the late 1990s, the competitive dynamics driving the electric toothbrush market were creating some new and very demanding business challenges for the managers of DAP’s Oral Healthcare electric toothbrush business unit. These new challenges demanded that Philips build large sales volumes quickly, introduce more product and packaging variations (leading to greater product diversity), offer faster response times in supplying a growing mix of products to a number of distribution channels globally, and to do so profitably in the face of relentless price competition and price erosion.

Need to Build Volume

By 1999, it was clear that achieving large sales volumes was a precondition to profitability in the electric toothbrush business. Since profits are largely made by selling brush replacements, it was essential to build up the largest possible installed base of Philips electric toothbrushes as quickly as possible. Large volumes were also necessary to justify making substantial investments in sophisticated automated production technology to lower unit costs and maintain high assembly quality. (For example, at large volumes, it became desirable on both cost and quality dimensions to use insert molding technology instead of stamping and fastening as a way of attaching metal parts to plastic parts.) Braun had already built a large volume business in electric toothbrushes that enabled it to invest in advanced technology for large-scale, high-quality, low-cost production. Moreover, the largest (by units) and fastest growing segment in the electric toothbrush market was for low-priced models. Philips was convinced that to remain a viable player in the electric toothbrush market, the firm had to achieve the large volumes that would make it possible to realize a cost basis comparable to (or lower than) Braun’s.

Market Demands for Product Diversity

Several market trends led to pressures to create an increasing amount of product diversity. New sales initiatives targeted at large retailers like Wal-Mart and Carrefour often had to offer product models with new styling and packaging variations, fueling a growing stream of models with customer-specific styling, color, and packaging variations.⁴ Growth in product diversity was also stimulated by rapidly growing sales to channels for Fast-Moving Consumer Goods (FMCG), since the generally low-priced product versions sold through these discount-pricing channels had to be differentiated from versions sold through traditional distribution channels. The need to expand sales of lower priced models also led to a succession of incremental design changes intended to save costs on materials and parts. The need for new packaging variations based on language also increased as consumers in more countries began to buy electric toothbrushes in significant volumes. The net effect of these market trends was a steady growth in model numbers based on product and packaging variations. By 1999, product and packaging variations within the basic product line shown in *Exhibit 2* had created more than 100 different model numbers.

Increasing Diversity Due to Technical Upgrades and Styling Changes

Since the primary value proposition that an electric toothbrush offers to consumers is superior dental cleaning capability, the major producers are continuously developing technically improved product models that might give them a marketing advantage in promoting the cleaning effectiveness of their products to consumers. In essence, in order to generate new sales of a rapidly maturing product, sales and marketing staff needed “something new to talk about” when calling on customers. By 1999, Philips electric toothbrush business was following a two-year product life cycle, with each life cycle bringing new models with improved brush tip designs, new variations on the basic motion of the brush, new colors, and new styling. Each new cycle of improved toothbrushes, however, accelerated the obsolescence of stocks of prior models. This indirectly added to product diversity, because often the phasing out of old product models and stocks was not carried out in a systematic way.

Faster Supply Chain Response

In addition to supporting shipments to traditional distribution channels, Philips Oral Healthcare increasingly had to accelerate and synchronize its supply chain to keep pace with the purchasing and marketing practices of large retailers and channels for FMCG. These retailers typically planned purchases and promotions of items like electric toothbrushes about 8 to 12 weeks in advance. As a result,

⁴ In the vocabulary used in Philips’ electric toothbrush business, models that differ in performance, functions and product features are referred to as *types*. Variations in packaging for individual large customers are known as *commercial versions*. Variations to meet country-specific requirements (e.g., appropriate power transformers to meet local voltage requirements) are referred to as *country versions*. Commercial diversity includes variations in accent colors (colors used in rubber switch covers and trim, and in imprinting on the toothbrush handle unit) as well as variations in packaging (to allow labeling in different languages and to accommodate various combinations of handle units and brushes).

Philips Oral Healthcare's supply chain was increasingly driven by the need to respond to demands of these special channels with large orders of special products to be delivered within an eight-week--or shorter--shipping date.

Continuous Price Erosion

As the major producers of electric toothbrushes lowered prices in efforts to build market share and installed base, and as large retailers with substantial buying power became increasingly important customers, Philips Oral Healthcare faced relentless price pressure and rapid price erosion. In the late 1990s, market prices for electric toothbrush generally fell at least 10-20% each year. In some markets, the rate of price erosion was even higher. For example, the average price of Philips electric toothbrushes sold in Germany, a major market for both Braun and Philips, fell from approximately 100 DM in 1996 to 39 DM in 1999--a rate of price erosion in excess of 25% per year.

Challenges to Philips Oral Healthcare's Supply Chain Capabilities

The combined effects of these competitive factors also led to significant production and logistics challenges with strategic importance for Philips Oral Healthcare's business. These challenges included the need for Oral Healthcare's supply chain to respond effectively to increasing variability in order levels for different models, high unpredictability in product mix, and rapidly rising costs of supporting product diversity.

Highly Variable Order Levels

Philips Oral Healthcare has a policy of being as responsive as possible in helping Philips National Sales Organizations (NSOs) meet the current demands of their various distribution channels and retailers. In practice, this policy means that maximum order quantities to be shipped are agreed with each NSO five weeks in advance of shipping, but the exact mix of models and versions to be supplied for an NSO order could be changed by the NSO as late as two weeks before shipment (known as the "consolidation date" for NSO orders). Because of this flexible ordering practice, the weekly production volumes for individual models required to fulfill current orders varied greatly from one week to another throughout the year. As shown in *Exhibit 3*, for example, HX1520E units on order to be produced and shipped each week averaged 7446 units during the first half of 1999, but volumes to be shipped week to week ranged from 28% of the average to 242% of the average.

Unpredictable Product Mix

In part because of the growing importance of special deals with large retailers for large volumes of specific versions to be shipped within eight weeks, order quantities for the various models in the Sensiflex product line became difficult to predict. As a result, it was becoming impossible to, predict more than two weeks in advance either the total production volumes and or the mix of products to be assembled and shipped by Oral Healthcare's Klagenfurt factory each week. Furthermore, total volumes tended to vary week to week simply because of the

familiar “bull-whip” effect in a supply chain. Because of their inability to predict future demand levels accurately, Philips NSOs often order larger-than-needed quantities to create their own buffer stocks for meeting future orders,⁵ but then reduce their current orders at the last possible moment (i.e., on the consolidation date) whenever their buffer stocks grow too large. A typical variation in volume and product mix due to these factors is shown in *Exhibit 4* for the first half of 1999.

A further challenge in managing the supply chain resulted from Oral Healthcare’s policy of allowing NSOs to change the product mix and actual quantity to be produced (up to the agreed maximum volume) at any time up to the production schedule consolidation date two weeks before actual production. The result of this ordering policy, as shown in *Exhibit 5*, was that on average orders for 80% of the product models to be produced in a given week were changed by NSOs *two weeks* before the scheduled production date.

Rising Costs of Supporting Product Diversity

In an effort to smooth and stabilize production flows in its Klagenfurt factory, several changes were made in Oral Healthcare’s electric toothbrush supply chain. By 1999, in an effort to respond as quickly as possible to last-minute orders from special channels or from NSOs for special promotions, processes to provide approximately 40% of the product diversity arising from special packaging requirements had migrated out of the Klagenfurt factory and were being carried out in Philips’ regional or national distribution centers. Packaging of products in distribution centers, however, added significant costs compared to packaging on the assembly lines in the Klagenfurt factory.

At the same time, efforts were made to smooth production volumes by producing some models for inventory. However, this practice created significant inventories and inventory carrying costs. In some cases, the wide and unpredictable fluctuations in orders for individual models exceeded the capacity of the Klagenfurt factory to produce and inventory adequate quantities of the various models, leading to stock outs and lost sales during demand peaks for some models. (*See, for example, the imbalance between production and shipments of the HX1520E model in the first months of 1999 in Exhibit 6.*) As a result, there were simultaneous increases in both backlogs of ordered products and inventories of unordered products. In these circumstances, a growing number of orders could only be realized after promised production dates, and such orders usually had to be shipped by airfreight or other special arrangements to meet delivery commitments to customers, thereby adding significant transportation costs.

⁵ NSOs also held buffer stocks to be able to react quickly to urgent customer orders or fleeting market opportunities, and to be sure that stocks were available during the replenishment cycle (i.e., residual levels of “cycle stocks” were held to cover orders received between normal delivery cycles). NSO stocks also were used to smooth production during seasonal demand fluctuations and while building up the stocks needed to support new product introductions or major customer promotions. Thus, NSO stocks served as an important buffer inventory for decoupling production schedules in Klagenfurt from both predictable and unforeseen fluctuations in demand from NSOs.

Finally, frequent introductions of technically upgraded or more fully featured models increased the obsolescence rate of product models held in inventory, resulting in lower margins or even losses when disposing of obsolescing product models.

Strategic Challenges

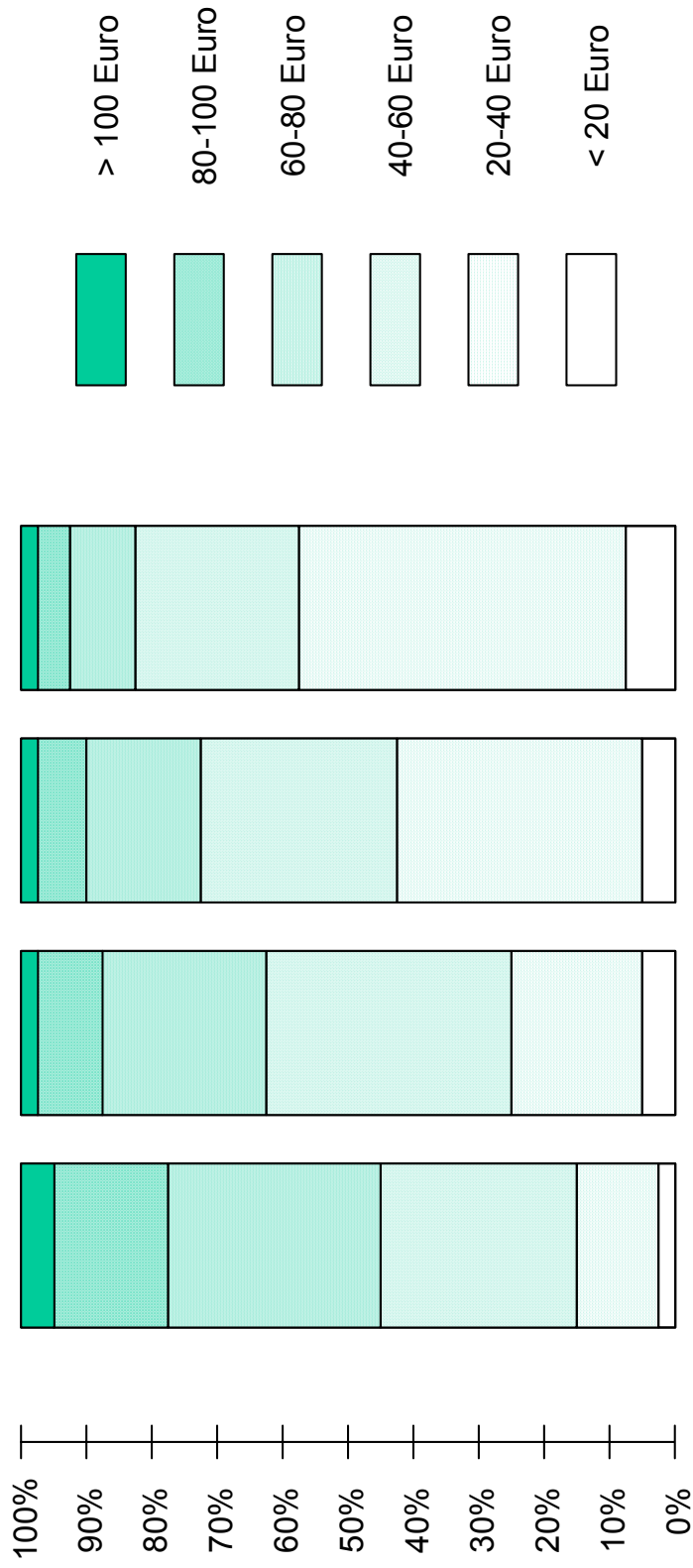
By 1999, it was becoming apparent to Philips Oral Healthcare's managers that their current way of doing business was not sustainable. Prices for Philips' biggest selling models were falling, costs to produce its current products were rising, profit margins were shrinking, and a growing number of the low-priced product models needed to build volume and installed base could no longer be sold profitably. Moreover, analysis of price trends in the increasingly competitive electric toothbrush market clearly indicated that current production volumes would have to double to obtain the economies of scale needed to operate profitably in the future. But doubling volume would require stimulating market demand through substantial investments in advertising and promotions. Given current trends in the competitive and financial conditions facing the business unit, it would be increasingly difficult to justify such investments to Philips DAP management.

In addition, supply chain challenges were becoming acute and were demanding an increasing share of management attention. Growing market demands for greater product diversity and special deals to be shipped on tight schedules threatened to overwhelm the Klagenfurt operation's production and logistics processes. The growing strains on supply chain performance were also limiting Oral Healthcare management's ability to reliably launch new product models and new marketing initiatives that were vital to building market share and increasing installed base.

To some Oral Healthcare managers, the current business situation was becoming increasingly problematic. On the one hand, to achieve the low costs needed to build volume and installed base, Oral Healthcare had to significantly increase its economies of scale, which implied mass production of a few products in large volumes. On the other hand, to meet market demands for product diversity, the business unit had to offer a growing range of product models, which implied production of many product models in more modest volumes. In addition, maintaining acceptable supply chain performance clearly required significant stabilizing of production flows, but demand for individual models fluctuated widely and was essentially unpredictable more than two weeks in advance of production.

Given the challenges they were already facing in simply trying to maintain current production and sales levels, however, it was clear to Philips Oral Healthcare's managers that there was not much future left for their business unit if it continued to use its current business model, product designs, and supply chain processes. In early 1999, the strategic imperatives facing Philips Oral Healthcare became increasingly clear: Find a fundamentally new approach to growing the electric toothbrush business, or prepare to exit the market.

Exhibit 1
Relative Market Value (Revenues) by Market Segment



Source: Company information

**Exhibit 2
The Philips Sensiflex Models**

SENSIFLEX 2000 SERIES



HX 2520



HX 2540



HX 2550

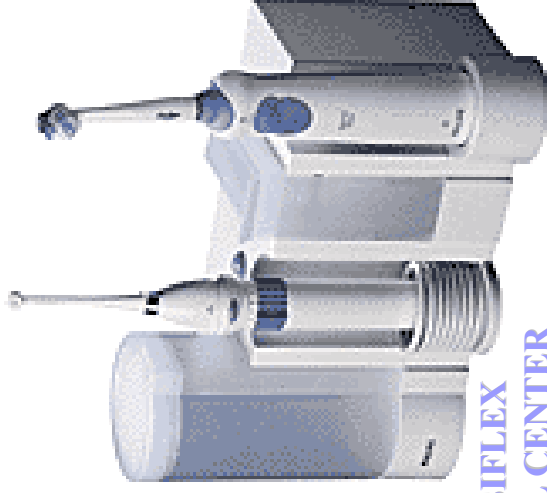
SENSIFLEX 1000 SERIES



HX 1520

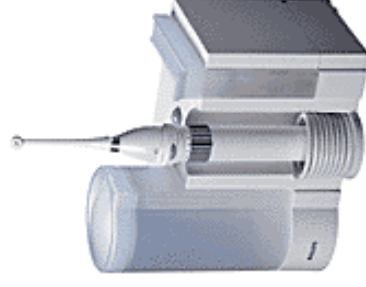


HX 1525



**SENSIFLEX
DENTAL CENTER**

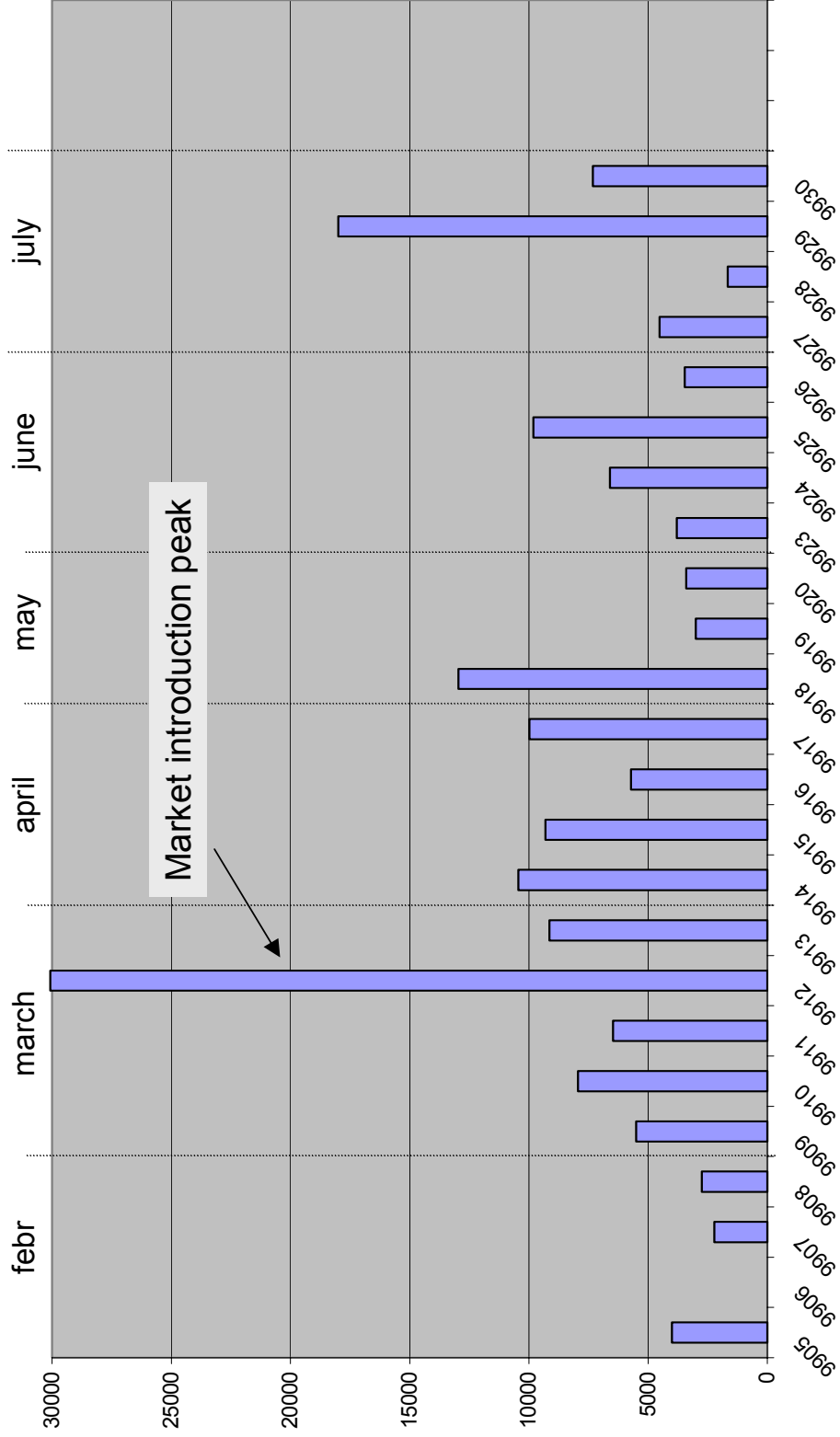
HX 2740



**SENSIFLEX
DENTAL WATERJET**

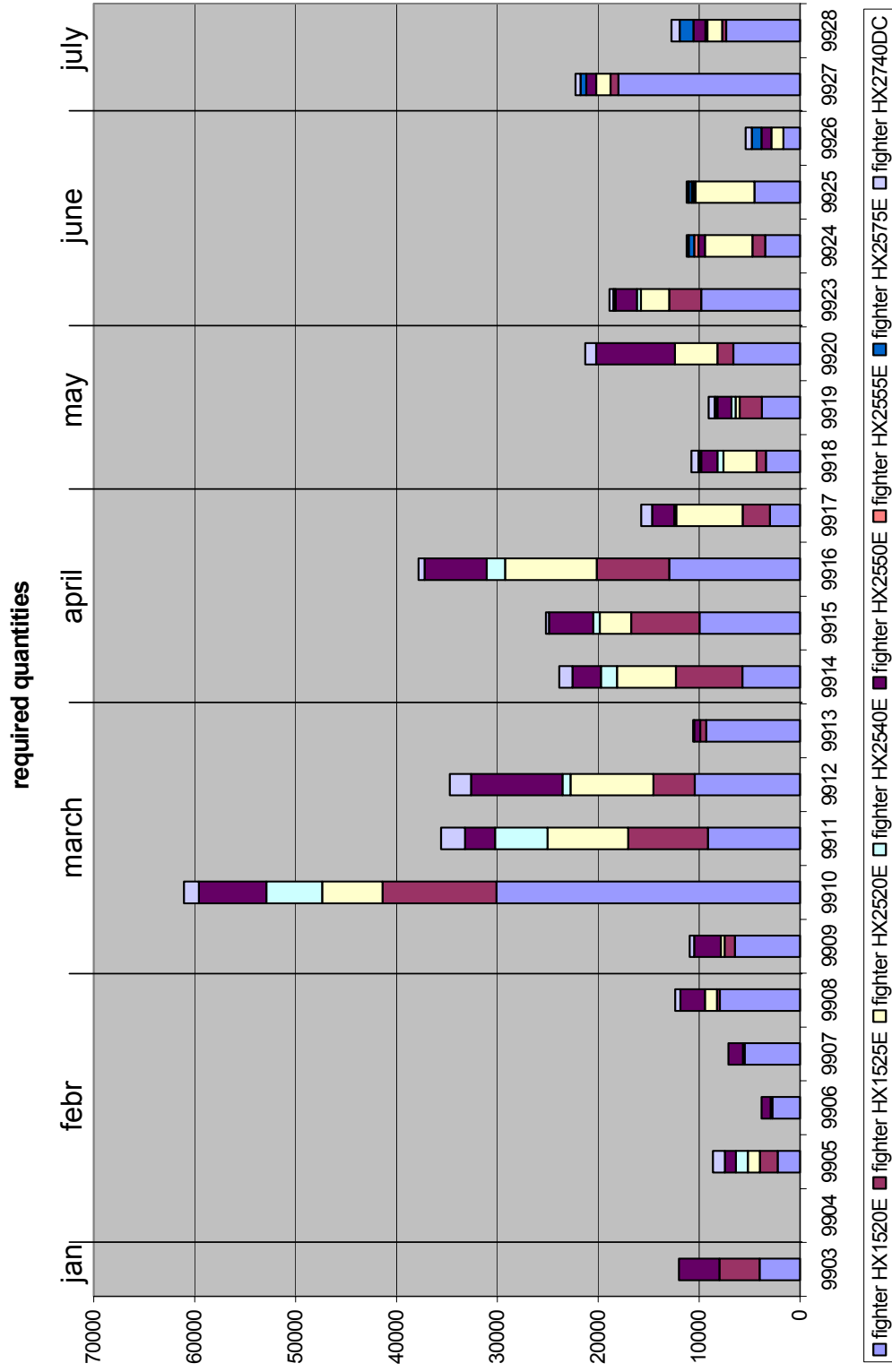
HX 2220

Exhibit 3
Fluctuations in Production Volumes for HX1520E Sensiflex Model, by Week (9905 to 9930)



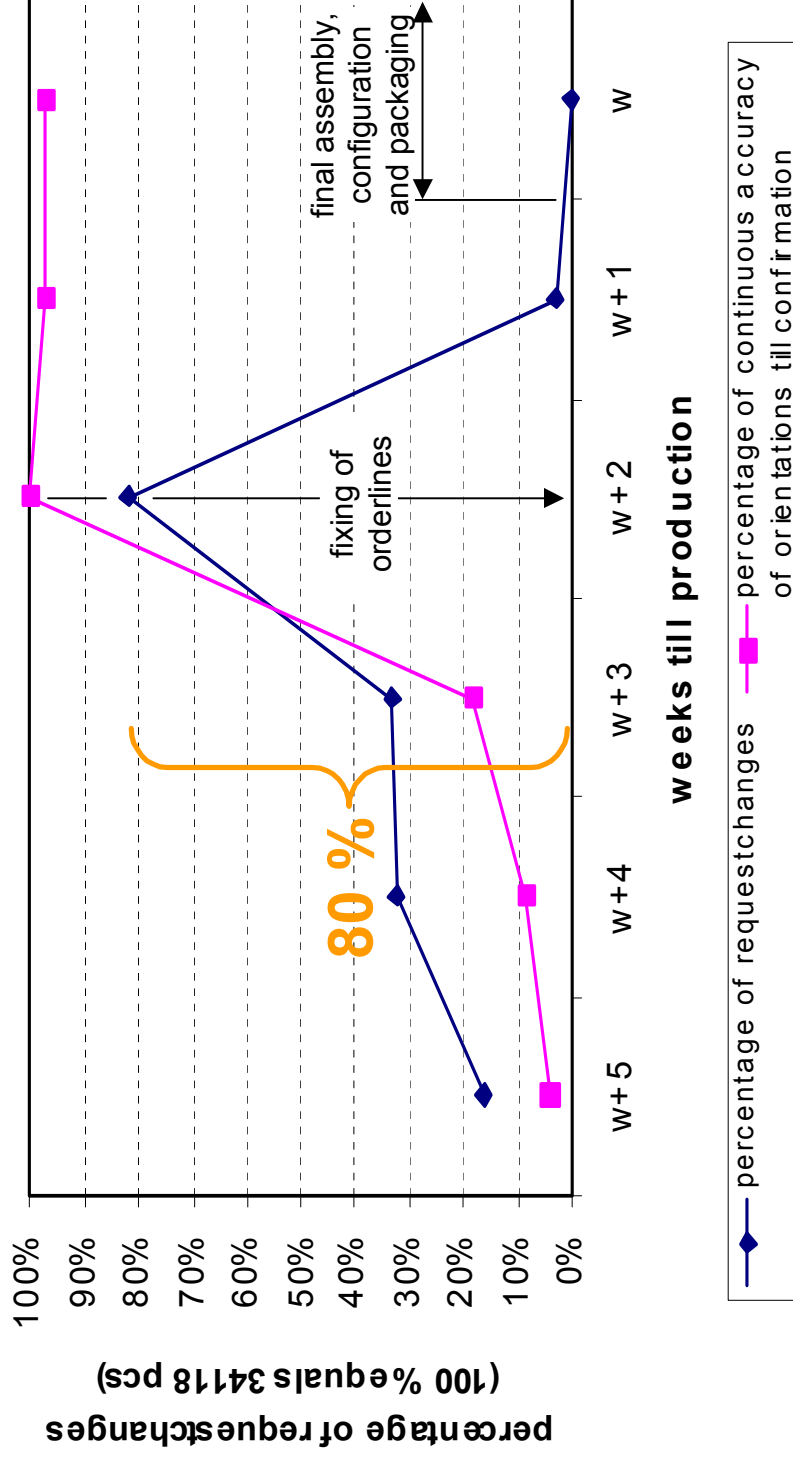
Source: Company information

Exhibit 4
Variations in Production Volumes and Product Mix during the First Half of 1999



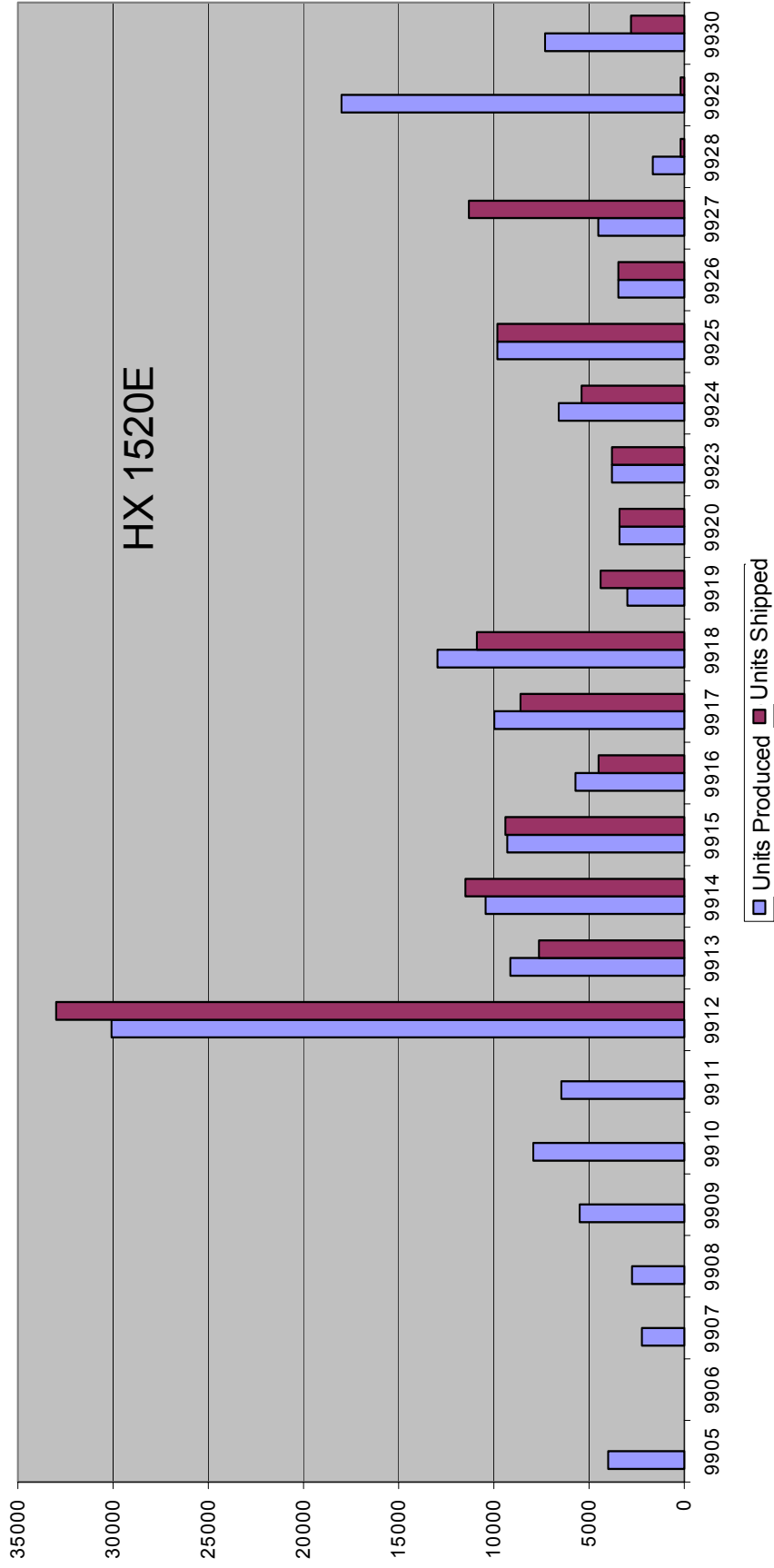
Source: Company information

Exhibit 5
Percentage of Changes in Orders by NSOs Prior to Production



Source: Company information

Exhibit 6
Imbalances between Units Produced and Units Shipped for Sensiflex HX 1520E Model



Source: Company information