

Chapter 3

Business Restructuring during the Structural Recession: 1971–1986

The End of Rapid Economic Growth and a Volatile Business Environment (1971–1979)

In August 1971, President of the United States Richard Nixon announced urgent measures to combat his country's trade deficit, including a halt to convertibility of the U.S. dollar to gold. The Nixon shock resulted in the collapse of the Bretton Woods system that had established the gold-dollar standard, and the dollar weakened against a stronger yen.

Japan's economy recovered in 1972 with the help of a government economic stimulus package, and inflation gradually gathered pace due to factors including a boom triggered by efforts by the cabinet of Kakuei Tanaka to “remodel the Japanese archipelago,” as well as a global rise in prices for primary products. With aggregate demand expanding, the market soared remarkably in early 1973. In February, Japan switched to a floating exchange rate for the yen, which appreciated to the 270–279 yen range against the U.S. dollar.

In October that same year, the Organization of the Petroleum Exporting Countries (OPEC) raised oil prices, causing the first oil crisis. Consumption immediately cooled, and stagflation occurred, marked by simultaneous price increases and economic slowdown. In 1974, Japan recorded its first year of negative growth since the end of the war.

In the fibers and textiles industry, exports came to be restricted by bilateral agreements as a result of the signing of a Japan-U.S. textile agreement in January 1972 and the multilateral Multi-Fiber Arrangement (MFA), which followed. It was a period when export-centric strategies for growing business were hard to implement. Toray, which had booked its highest earnings ever in fiscal 1973, suffered sales and profit contraction in fiscal 1974 and in fiscal 1975 recorded its first ordinary loss since the founding period. An ordinary loss was booked again in fiscal 1977.

The person in charge of Toray during the 1970s, and therefore tasked with navigating a volatile business environment, was President Tsuguhide Fujiyoshi. In November 1971, then vice president Fujiyoshi took up his position as president, and at the same time Kizo Yasui, who had also been



Tsuguhide Fujiyoshi



Kizo Yasui

vice president, became chairman. The management policy presented by Fujiyoshi had two tracks—revitalization of the synthetic fiber business and diversification of businesses other than fibers and textiles. It was the first time Toray's chief executive had introduced a policy of diversified business management.

During the 1960s, Toray had built a system for supplying its own raw materials for synthetic fiber. Around 1970, the company was already producing in-house all of the caprolactam it used to make nylon 6, as well as 90 percent of the dimethyl terephthalate (DMT) and all of the terephthalic acid (TPA) it used as raw materials for polyester. As for acrylonitrile, a raw material used for "Toraylon" acrylic fiber, 70 percent of the required amount was sourced through an affiliate. Toray also had systems in place for supplying its own raw materials, with the Kawasaki Plant able to provide cyclohexane and paraxylene, used to make caprolactam and DMT/TPA. However, the premises for doing so were completely undermined by high oil prices stemming from the two oil crises in 1973 and 1979, and ongoing appreciation of the Japanese yen.

To ensure that it had appropriate control over the cost of its products, Toray shifted to a materials policy that did not insist on self-supply. In April 1983, a purchasing and logistics division was established and progress on streamlining operations was sought through procurement from outside sources. At the same time, Toray adopted a plan to advance joint operations with raw material supplier Nippon Petrochemicals Co., Ltd. In 1983, having made progress on downsizing facilities and the workforce, the Kawasaki Plant started out afresh as Ukishima Aroma Co., Ltd., a 50-50 joint venture with Nippon Petrochemicals. Toray transferred its shareholdings in Ukishima Aroma to Nippon

Petrochemicals in 1987, thus bringing an end to its raw material production operations.

Looking Ahead to “Toray of Tomorrow” (1980–1986)

In June 1980, Fujiyoshi moved aside to become chairman and Vice President Masao Ikawa took over as president. However, Ikawa met with misfortune as he was taken ill within half a year of taking up the position and he had to step down. He was succeeded by Yoshikazu Ito, who became president in January 1981. Ito stressed that Toray had to win in the market and, saying that marketing and R&D went hand-in-hand, worked to define a management outlook for the mid- to long-term, for example through the formulation of a long-term management vision and strengthening of marketing development capability.

On September 22, 1985, finance ministers of G5 nations (the U.S., the United Kingdom, West Germany, France, and Japan) met at the Plaza Hotel in New York with the goal of correcting an overvalued U.S. dollar and agreed, among other matters, that an orderly appreciation of major currencies against the U.S. dollar was desirable. This was the Plaza Accord. The value of the U.S. dollar began its decline right away and



Masao Ikawa



Yoshikazu Ito

one year later was trading in the 150 yen range, compared to 240 yen immediately prior to the agreement. The rise of the yen created a tough business environment for Japanese export industries, but on the other hand it spurred a spree of purchasing of U.S. assets with Japanese capital and a boom in overseas travel by Japanese people. For Japanese manufacturers, it led to an increase in overseas production. Because the Korean won and Taiwanese dollar appreciated alongside the yen, textile products from Asian newly industrialized economies (NIEs)—Korea and Taiwan—which had replaced exports from Japan to the U.S. and Europe lost their competitiveness. Southeast Asian (primarily ASEAN) nations suddenly emerged as an origin for textile exports to western markets.

At around that time, Toray was advancing its third mid-term business plan that would take it through to fiscal 1986, the year of its 60th anniversary. Under the banner Challenge 60, the plan was to carry out aggressive capital investment like never before, to the value of 150 billion yen over three years. As group-wide priorities to be addressed over the three years, projects such as strengthening of corporate structure,

Corporate Philosophy	Contributing to society through the creation of new value with innovative ideas, technologies and products
Management Policy	<ul style="list-style-type: none">• Put people center stage• Generate market-inspired ideas• Grow with the times
Toray Motto	Fostering trailblazers to take us even further <ul style="list-style-type: none">• Visit customers more• Focus on goals more• Be more interesting• Visit operations more• Be more persistent

involving modernization of filament yarn facilities, were complemented by the formation and launch of a corporate identity (CI) project.

'TORAY'

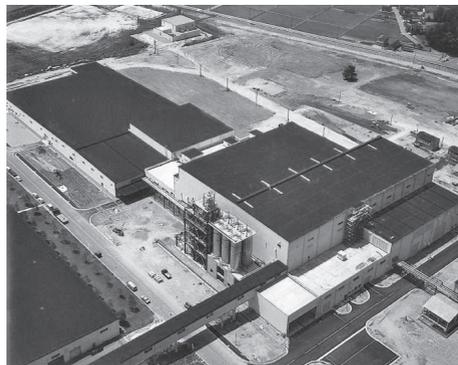
New corporate symbol

During 60th anniversary commemorations on April 16, 1986, the company announced its Corporate Philosophy and Management Policy, the Toray Motto, and a new corporate symbol. The quotation marks in the symbol represent elements such as dialogue and standing out.

Innovation of Fiber Production Technology and Business Restructuring

At the end of 1981, Toray set up a project to modernize operations relating to filament for apparel use in order to develop next-generation yarn manufacturing technology. Central to the project was the development of new technology for manufacturing yarn revolving around the creation of a one-step process based on high-speed spinning, elimination of breaks (called ZB; *Zero Breaks*), and automation.

In April 1984, a decision was made to build a nylon filament yarn facility at the Ishikawa Plant, which had started out as a polyester filament yarn factory in June 1975. The nylon filament yarn



Ishikawa Plant's new nylon filament yarn factory (1985)

facility went online in August 1985 as a state-of-the-art plant replete with the latest technologies and facilities for maximizing labor savings and automation.

Moves such as the opening of the Textiles Development Center on Seta Plant premises in October 1981 and installation of an artificial weather simulation laboratory, “Technorama,” in November 1983 were part of synchronized efforts to bolster textile development facilities, strengthen structures for fiber application processing, pursue collaboration with apparel manufacturers, and strengthen marketing.

Since the 1960s, Toray’s synthetic fiber material development had been geared toward generating high-value. A prime example of a product for which this was achieved was “Sillook” fabric, made from modified cross-section filament. The development eventuated through a collaboration with the place where the processing took place. Sillook fabric has a silk-like luster and soft texture created by soaking fabric woven with Sillook modified cross-section polyester filament in an alkaline solution to dissolve the surface of the fiber, reducing the weight. Employing technologies used in Japan in the production of silk fabric, this continuous denier reduction treatment was successfully carried out by Komatsu

Seiren Co., Ltd., a dyeing company in Ishikawa Prefecture that had spent many years on the development. Afterward, Toray used polyester to develop a blended yarn with varying degrees of shrinkage, naming it “Sillook II,” and then developed



Sillook 20th anniversary (October 1983)

“Sillook III,” a yarn with a latent random crimp in imitation of the random crimp of silk, and marketed it as a textile with high added value. The Sillook series achieved growth due to its quality and systematic marketing. Around the time of the 20th anniversary of its launch, it accounted for around 15 percent of the total volume of polyester filament yarn.

In June 1971, “Ecsaine” (changed to “Ultrasuede” in 2013) was selected as the trade name in the domestic market for Toray-223, an artificial leather with a deerskin touch. That same month, the Gifu Plant commenced operations. It was right at that time that the Japan-U.S. textile war was reaching its peak, but Toray-223, which was similar to deerskin and other suedes, also lightweight, and had excellent coloring properties, earned a strong reception as interest among protectors of animals’ rights swelled, particularly in the U.S. The same year, Toray entered an agreement with major U.S. converter Springs Mills, Inc., opening up a sales channel into the U.S. domestic market. Sales began using the brand, Ultrasuede.

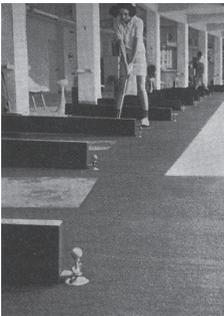
In Europe, Toray licensed its artificial leather technology to Italian synthetic fiber company Azienda Nazionale Idrogenazione Combustibili (ANIC) S.p.A (now EniChem S.p.A). The two companies signed a licensing agreement in October 1972, and established Iganto S.p.A (now Alcantara S.p.A) in April 1974. Iganto was to manufacture and sell artificial leather under the brand, “Alcantara,” and operations got



Iganto (now Alcantara) (Italy, 1977)

underway in June 1975. In March 1977, the company also received technology for staple fibers production, so that it then had an integrated production system from staple fibers through to the finished product.

Moving into the latter half of the 1970s, competition among materials in the industrial materials and interior domains intensified with the sophistication and diversification of customer quality requirements. Toray adopted a strategy of marketing the three materials—nylon 6, nylon 66, and polyester—together. By combining the three materials and manufacturing methods, Toray aimed to unearth new applications in the general industrial materials and interior domains in addition to the main existing applications of tire cords and fishing nets. A broad range of applications were sought, including “BCF” nylon for carpet, nylon 66 for computer ribbon, “Axstar” non-woven fabric made from polyester filament, and artificial turf “Spuckturf.” In April 1983, an Industrial Material Development Center was established on the premises of the Seta Plant, and development of fiber processed products for use as industrial material expanded.



Spuckturf artificial turf



Tetoron tire cords

Development and Reorganization of Overseas Fibers and Textiles Business

One starting point for Toray's overseas fibers and textiles business was the Tangerang Project in Indonesia. In the early 1970s, the company set up centers for integrated production in the Tangerang district on the outskirts of Jakarta, establishing P.T. Indonesia Toray Synthetics (ITS), which undertook polyester polymerization through to spinning, and P.T. Indonesia Synthetic Textile Mills (ISTEM), manufacturer of polyester/ rayon blended yarn and fabric. Another starting point was the Textile Alliance Ltd. (TAL) Project undertaken with overseas Chinese entrepreneurs based in Hong Kong. The aim of the project, while positioning advanced western nations as the desired end markets for sewn products, was to establish production and processing bases for each stage in locations worldwide deemed most suitable for facilitating the delivery of products to those end markets, and to build plants there. As part of the project, Toray established Penfibre Sdn. Berhad (PFR) as a joint venture with TAL in the Malaysian province of Penang, which had set up a large (for its time) free trade zone and had adopted a policy of luring businesses to promote trade. By teaming up with companies in the TAL Group, Toray built a center of polyester/cotton blended textile production with integrated staple fibers, spinning, weaving, and dyeing operations.

Joint operations with TAL were undertaken in Thailand and Indonesia too. Toray had already established companies in Thailand in 1963—polyester/rayon blended textile manufacturer TTTM, and nylon filament yarn company Toray Nylon Thai Co., Ltd. (TNT, now Thai Toray Synthetics Co., Ltd. (TTS))—but additionally acquired an equity stake



LTX (Thailand)

in TAL Group company Luckytex (Thailand) Company Limited (now Luckytex (Thailand) Public Company Limited; LTX) in 1972. In Indonesia, Toray established P.T. Easterntex (ETX) in Surabaya, East Java, in 1973. Both LTX and ETX engaged in spinning and weaving of

polyester/cotton blended fibers.

In 1981, Toray accepted an offer from major TAL shareholder Jardine, Matheson & Co., Ltd. by purchasing the latter's TAL holdings of 3.3 million shares. The acquisition increased Toray's stake to 61.5 percent (the total investment coming to 13.8 billion yen), making TAL and all of its group companies consolidated subsidiaries. Once TAL's reorganization was completed in 1983, having executed a strategy to split the company into three, Toray was in possession of a broad network of fiber application processing businesses, engaged in spinning, weaving, and dyeing, spanning three major ASEAN nations—Thailand, Malaysia, and Indonesia. At this point, all companies were suffering big losses, but export competitiveness increased considerably as the yen, won and Taiwanese dollar appreciated in the wake of the 1985 Plaza Accord, leading to success in western markets and dramatically improved earnings across the board.

Plastics Business Development

After the first oil crisis in 1973, the “Lumirror” polyester film business enjoyed rapid growth as, in addition to existing uses, new opportunities

were identified in the market for magnetic tape for the various home video formats. Lumirror went on to secure an overwhelmingly dominant position, accounting for around 90 percent of the global market for video tape base film. And demand in areas other than magnetic tape increased at roughly the same pace as the magnetic tape demand.

The “Torayfan” polypropylene film business, which had long been in a slump, took until fiscal 1983 to pull off a remarkable comeback. Torayfan capacitor film was well received by customers at home and abroad due to its high functionality. In 1984, Toray was approached about a takeover of American polypropylene manufacturer Trea Industries, Inc. of Rhode Island. An agreement was reached in February 1985 and the acquisition was completed in May. Supplied with technology from Toray, Trea (now Toray Plastics (America), Inc.; TPA) started work on a new plant. “Toraypef” cross-linked high-expansion polyolefin foam had been experiencing an extended slump, but the future was looking brighter with potential seen in areas where the product’s characteristics could be harnessed, such as instrument panels and molded door panels in automobiles.

In the resin business, though the oil crisis momentarily slammed the brakes on the growth of such products as nylon resin, higher oil prices turned out to be beneficial over the mid-term. In the automotive industry, in particular, plastic came to be readily used as a way to reduce weight, and therefore improve fuel economy. “Toyolac” ABS resin business was arrived late on the scene, even for the Japanese domestic market, but Toray managed to establish a unique position by carving out a market for automotive exterior applications. As for polybutylene terephthalate (PBT) resin, Toray started building up a market in 1972. In fiscal 1980, the

fifth year since production began at the Nagoya Plant in March 1975, the business booked a profit.

With regard to electronic materials, Toray was developing heat-resistant insulating varnish and transparent conductive film during the early 1970s when it also started importing and selling ‘Kapton’ polyimide film developed by DuPont. After establishing the Electronic Materials Department in 1979, Toray started sales of electron beam resists the following year, 1980, polyimide coatings in 1985, and “Raytela” plastic optical fiber in 1986. It was during this period, when white goods (e.g. washing machines and refrigerators) were being replaced as the core home appliance business by information and communication electronics such as televisions, personal computers and mobile phones, and the market itself was rapidly growing, that Toray laid the foundations for business in the new domain of electronic materials.

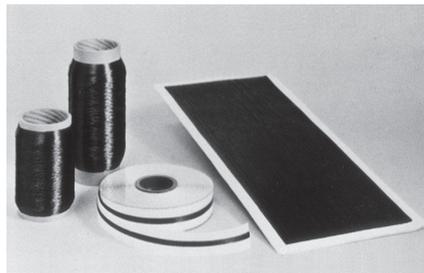
Progress and Achievements of New Business Development

In April 1971, the New Projects Development Department, a new organization that did not fall under any business division, was set up to play the central role in advancing and coordinating the planning of new businesses. While new businesses, in Toray’s case, would preferably consist of new products stemming from seeds of technology that the company already possessed, the new department came up with new businesses that included market-driven, needs-based businesses. Carbon fiber composite materials are a classic example of a seeds-based new business that opened up new markets with new materials that never existed before. Related R&D activities were pursued in-house since the early 1960s and never

ceased. Not even during times of recession did anyone entertain the idea of ending the research.

A facility for trial production of high-performance polyacrylonitrile (PAN)-based carbon fiber was established at the Shiga Plant, and sales of the material, under the trade name “Torayca,” began in August 1971. In November the following year, work began on construction of a facility with a six-ton monthly production capacity at the Ehime Plant. Meanwhile, Toray established a sales channel into the U.S. market, primarily for commercial aircraft applications, through Union Carbide Corporation, and developed the business in Japan, too, with applications to sport (golf shafts, fishing rods, and tennis rackets) and industrial uses. In July 1981, Toray settled on a plan to make inroads into Europe through a joint venture with Société Nationale Elf Aquitaine (now Total S.A.), as recommended by the French government. The two companies signed a technology assistance agreement in September 1982 before establishing Société des Fibres de Carbone S.A. (SOFICAR; Elf: 65 percent, Toray: 35 percent) in December. SOFICAR later became a three-way joint venture with the participation of Pechiney Ugine Kuhlmann S.A., whose plans for a joint venture with Hercules Inc. had fallen through. The company’s plant in Abidos, near the border with Spain, started operations in August 1985.

In the pharmaceuticals domain, Toray began research on natural prostaglandins in 1971. Clinical development of prostaglandins as a labor



Torayca carbon fiber

induction agent were conducted jointly with Kaken Chemicals K.K. (now Kaken Pharmaceutical Co., Ltd.) and permits were granted for the manufacture of $\text{PGF}_{2\alpha}$ in August 1977, and a stable PGE_2 in September 1983. Both were sold by Kaken Chemicals. Also in 1983, phase I clinical trials of a PGI_2 derivative as a new drug (trade name “Dorner”) began.



Interferon research in progress

Interferon research, too, moved into development of a system for large-scale production and refining of human diploid cells in the late 1970s. In 1978, the interferon research team at Japan’s Ministry of Health and Welfare (now the Ministry of Health, Labour and Welfare) commenced clinical trials.

In December 1982, Toray applied for a permit to manufacture natural high-purity interferon β under the trade name “Feron,” having succeeded in its large-scale cultivation. It was to be used in the case of indications of malignant melanoma, glioblastoma (a type of brain tumor), and hepatitis B. Approval of manufacturing was granted in April 1985 for all but hepatitis B. It was Japan’s first case of an interferon being approved as a pharmaceutical. As for hepatitis B, the Ministry of Health and Welfare directed Toray to carry out additional clinical trials. After this was done, approval for the additional efficacy was granted in September 1986.

In the medical products field, full-scale production of “Filtryzer” artificial kidneys at the Okazaki Plant got underway in 1979. In addition, “Anthron” antithrombogenic catheters were added to the product lineup

in 1977. Toray Medical Co., Ltd. was established in 1980 to sell Filtryzer and peripheral equipment.

In the graphic systems business, the “Torelief” photosensitive nylon resin relief printing plate was launched in 1973, as was the “Toray Waterless Plate,” a lithographic printing plate that does not require dampening water, in October 1979. Development and production operations for reverse osmosis (RO) membrane business were transferred from the Engineering Research Laboratories to the development department in 1975. And in April 1980, sales of membrane modules under the trade name “Romembra” began. Full-scale production got underway at the Ehime Plant in 1985.



Kickoff ceremony for the RO membrane facility at Ehime Plant (April 1985)

In the optical business, Toray supplied plastic spectacle lenses for eyesight correction and eyestrain prevention filters for visual display terminals (VDT). “Breath-O” soft contact lenses were also developed using a polymer with high moisture content, and went on sale in Japan for use after cataract surgery in August 1981. In 1986, Toray launched the home water purifier, “Torayvino,” which applies artificial kidney hollow-fiber membrane technology, and worked to develop sales channels and generate demand.