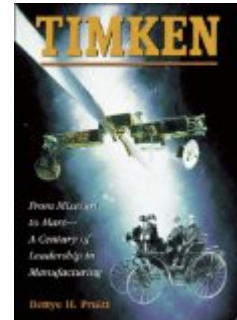


Bettye H. Pruitt. *Timken: From Missouri to Mars--A Century of Leadership in Manufacturing.* Boston: Harvard Business School Press, 1998. xvii + 514 pp. \$39.95, cloth, ISBN 978-0-87584-887-7.



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Established in 1899 by Henry Timken to commercialize tapered roller bearings axles for carriages, the Timken Company today is a multinational corporation, with sales of about \$2.6 billion (1998) and 21,000 employees, engaged in the manufacture and sales of bearings and alloy steel products that find application in a wide variety of industries. To celebrate its centennial, the Timken Company commissioned the Winthrop Group Inc. to write a history of the firm. *Timken: From Missouri to Mars--A Century of Leadership in Manufacturing* is the result of historian Bettye H. Pruitt's research (with the assistance of Jeffrey R. Yost and others). Pruitt uses a variety of sources, including internal corporate documents and personal correspondence of several members of the company, as well as interviews with numerous individuals from the company itself, its affiliates, and outsiders.

The book's rich detail testifies to the quality and thoroughness of the author's research. While primarily focused on the business aspects of Timken's life, the book also discusses the firm's relationship with the surrounding communities and

its philanthropic activities while providing biographical sketches of many individuals associated with the firm, including Timken family insiders as well as outsiders. These sections contribute to establishing a link between the personalities of the firm's leaders and the culture of the organization. This is an important element in the author's assessment of Timken's evolution. Pruitt emphasizes the firm's identity and sense of purpose as an anchor of stable values, enabling the strategic and organizational adaptation that allowed it to survive and prosper. These cultural factors are linked to the Timken's family continuing control of the firm after a century of activity.

While the family ownership and control constitutes a distinctive feature of the firm, the events in Timken's history are in many respects quite representative of U.S. manufacturing industries more generally, not only from a technological and economic viewpoint but also from a cultural one, as the author acknowledges in the book's early pages. The chronological sequence of chapters is punctuated by two focus chapters that describe the company's establishment of new production

plants (see *infra*). These, Pruitt argues, symbolize the technological and cultural differences between the mass production and the flexible manufacturing eras in Timken's corporate history.

The origins of the Timken company can be traced as far back as 1855, to a carriage business set up by Henry Timken, the son of German immigrants in St. Louis, Missouri. During the 1890s, Henry became involved in the development of anti-friction bearings and, together with his nephew Reginald Heinzelman, he invented a tapered roller bearing for which they received a patent in 1898. One year later, the Timken Roller Bearing Axle Co. was incorporated for the commercialization of carriage axles mounting their patented bearings. The growth of the bearing business followed that of the automobile industry, although since the 1910s Timken began to develop other markets for its products. Timken bearings were sold at a premium over competing products, but over time, increased competition and the possibility of vertical integration by car manufacturers threatened the company's future growth. Under the stewardship of Henry Timken's son, Henry H., the firm committed itself to competing on price and quality to sustain revenue growth, a strategy that prompted Timken to seek cost savings by establishing an in-house facility for steel production.

Pruitt suggests a transaction cost rationale for integration related to Timken's steel quality requirements which resulted in high steel prices, monitoring and testing costs. Timken was also experiencing difficulties in securing reliable supplies of high quality steel from electric arc furnaces. These factors pushed Timken (and its main rival, Swedish firm SKF) to invest in a facility for steelmaking. The decision was based on fairly inaccurate estimates: the final investment costs exceeded the initial forecast by a full order of magnitude (p. 74). As a result, Timken was forced to seek external finance from banks first, and to offer part of the company's stock to the public in

1922. In spite of the earlier reference to transaction and manufacturing costs, Pruitt's account indicates that the internal capability in steel production proved to be of fundamental value for the innovative performance of the firm as it provided Timken with control over the interface between bearing design and steel quality. Thanks to the learned capabilities in product, process, and sales engineering, Timken experienced profit and revenue growth throughout the 1920s.

Until the Great Depression, Timken's policy of paying high wages had succeeded at keeping unions out of its production plants. Only in the 1930s did efforts by the United Steel Workers to unionize the company's plants in Canton, Ohio, succeed. The firm's relationship with the union was marred by hostility. The management spurned any interference with its control of shopfloor activities. Timken was committed to a managerial style informed by hierarchical command and control, a practice whose continuity inside the firm was facilitated by recruiting executives through internal promotions. The management's anti-union stance played a role in 1950 when a state-of-the-art production plant was set up in Bucyrus, Ohio, a rural area that Timken hoped could provide a union-free environment. The new plant featured extensive automation of the manufacturing process and focused on the mass production of standardized products. Timken's management could benefit from vastly improved information systems and hoped that its control over the production process would be unfettered by conflict with its labor force. Generous employee compensation was expected to avert the unionization of the plant. At the same time, the firm intended to provide workers with the training needed to realize job rotation programs and with team-based performance incentives.

The scale economies realized at the Bucyrus plant were the basis for Timken's retention of a first-mover advantage in the market for standardized tapered roller bearings. In contrast with com-

petitors whose product lines encompassed alternative bearing designs, Timken remained committed to its time-honed strategy of competing on price and quality in the tapered roller bearing segment. The same conservatism was also visible in the company's structure, where the organization continued to be along functional lines. Pruitt identifies these facts as symptoms of the incipient divergence of Timken's business strategy and structure from the pattern typical of U.S. manufacturing firms. These differences notwithstanding, Timken enjoyed a prolonged period of growth and profitability. It developed a network of international affiliates whose integration became an important focus of managerial attention. Driven by the objective to coordinate sales and production on a worldwide basis, efforts were made to establish uniform quality and dimensional standards that could realize interchangeability of products across plants. Whereas Timken's management effectively addressed these operational needs, it was not quite as successful at developing an appropriate business strategy model for its international affiliates. The business model behind the Bucyrus plant that succeeded in the U.S. did not enjoy the same fate in other markets, partly because the firm did not have a first-mover advantage vis-a-vis its competitors.

The competitive pressures in the U.S. bearing market increased during the 1960s. In the usual pattern, Japanese entrants first targeted the low-cost end of the ball bearing business. Having succeeded in that market segment, the Japanese firms began to aim at the low-end of the tapered roller bearings market. Timken's ability to withstand their competitive threat was the result of its continuing commitment to modernize manufacturing facilities and expand capacity. New plants were set up in Gaffney, South Carolina, in 1971 and in Lincolntown, North Carolina, in 1979. To be sure, competition put a squeeze on profit margins in the bearings business during the 1970s, but Timken weathered the storm satisfactorily thanks to the profitability of its steelmaking divi-

sion. In that area too, Timken upgraded and expanded manufacturing facilities (notice the acquisition of Latrobe Steel in 1975) and developed other markets for its steel products in addition to bearings.

By the late 1970s the firm's ability to sustain continuous improvement in bearings' performance was diminishing. Problems had emerged in regard to the quality of internal steel supplies. The response to this crisis, initiated in 1978 as the Clean Steel Program, included a benchmarking exercise conducted at steelmaking plants in Europe and Japan which revealed that Timken needed to catch up with the industry's best practice in order to secure its competitive standing in the bearings business. In 1981, Timken decided to build a new steel plant at Faircrest, Ohio.

These events were a watershed in the firm's history. A prolonged period of internal change ensued that wrought radical transformations in Timken's organization of shopfloor work as well as its corporate structure and culture. Existing organizational practices had created an inward-looking culture that failed to absorb useful managerial and technological knowledge from the outside. The outcomes of the benchmarking exercise shook the management's confidence in the organization's ability to identify and solve problems internally and to generate the technological and organizational improvements needed to sustain the competitive position of the firm. Outside consultants from McKinsey & Co. collaborated with insiders to restructure the company. Even more important, they facilitated the overhaul of the corporate culture, and particularly the abandonment of the strict top-down approach to management that had characterized Timken since its early years. The book's final chapters portray Timken as an organization alert to the need for strategic adaptation and willing to embrace change in response to external events. In what may be considered a radical departure from the company's conventional wisdom, Joseph Toot, Jr. described the

Timken Company as having moved from "a strict, traditional, product orientation toward the application of certain skills which we believed we possessed in an exceptional way" (p. 393).

The book's strength is without a doubt in its detailed account of the corporate history, which a reader without an all encompassing interest in the matter may find dizzying at times. While I found the book pleasant and engaging to read for the most part, occasionally, the author's attempt to provide details ends up clouding the story line more than I thought desirable, particularly toward the final chapters of the book. Perhaps inevitably, the book touches only briefly upon events and issues that interested readers will want to know more about. For example, Pruitt tells us that while British Timken had been using Statistical Process Control (SPC) after World War II, the U.S. headquarters' efforts at standardizing procedures across plants were responsible for its elimination. Pruitt says that British Timken promptly conformed to the orders from Canton (pp. 232-34), but there is no way to tell whether British Timken benefited from SPC, and if so, why did it simply conform to the orders? Considering that quality control processes were resumed twenty years later, it would have been interesting to learn more about the circumstances of SPC's demise.

While the book rarely attempts to generalize from Timken's experience on specific issues, the introductory chapter places Timken's corporate history in a broader perspective provided by the scholarly debate concerning the factors promoting corporate success and longevity. Pruitt lays out two views, contrasting Chandler's[1] emphasis on a firm's strategic focus on core businesses and investments in organizational capabilities, with the cultural approach found in Collins and Porras[2] and de Geus[3] emphasizing a core ideology that "guides and inspires people throughout the organization and remains relatively fixed for long periods of time" (p. xiii). This contrast does not re-

ceive much analytical attention in the rest of the book. As Pruitt reckons, both themes appear in Timken's history. This suggests that the views presented as mutually exclusive need instead to be integrated with one another. In fact, I would argue that Pruitt's own narrative supports the broad proposition that an organization's culture (intended as a constellation of values and norms of interaction) is an important determinant of its capabilities. While the rich evidence discussed in the book clearly bears on the nexus between culture and capabilities, the nexus is not adequately developed. Pruitt's recurring references to the legacy of "a compelling sense of purpose and a cohesive corporate culture" (p. 31), or the "timeless importance of corporate purpose and identity" (p. xvi) seem to identify these cultural factors as the key determinant of Timken's longevity and success. These emphases are not supported, in my opinion, by adequate analytical arguments clarifying the relationship between these concepts and corporate success.

Pruitt's book provides interesting insights on a much broader range of themes than my review suggests. Among them, I would mention the discussions of patent litigation, the effects of antitrust restrictions on its relationships to foreign subsidiaries, lobbying for antidumping tariffs, the development of internal R&D programs, technological developments in steel and bearing technologies, the firm's relationship with standard-setting organizations, as well as its marketing efforts with respect to particular customers or industries. As a result, the book deserves the attention of a wide audience of scholars, from business and economic historians to scholars of industrial organization, strategic management, and technological innovation.

Notes

[1]. Chandler, Alfred D. Jr., *Scale and Scope: The Dynamics of Industrial Capitalism* (Cambridge, Mass.: Belknap Press, 1990).

[2]. Collins, James C. and Jerry I. Porras, *Built to Last: Successful Habits of Visionary Companies* (New York, N.Y.: HarperCollins, 1994).

[3]. de Geus, Arie, *The Living Company: Habits for Survival in a Turbulent Business Environment* (Boston, Mass.: Harvard Business School Press, 1997).

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