Issues associated with the management of knowledge and intellectual capital have moved to the forefront of organizational studies. David Teece (1998) recently argued that secure market positions will not be possible in the absence of unique upstream intangible assets. Competitive advantage will be a function of the ownership of knowledge assets, and the ability to combine knowledge assets with other assets to create value. *Knowledge Works* deals explicitly with these knowledge issues by exploring how Toshiba Corporation creates value through factory-based resources and capabilities. Knowledge works is a construct proposed by Mark Fruin to describe industrial organizations in which the production of knowledge and know-how are more important than the management of tangible things. In contrast to the conventional view of factories as manufacturing centers, knowledge works focuses on developing new and better products, advancing manufacturing technology, and increasing value through lowering costs, improving product quality, and speeding the development process.

The book is based on Fruin's study of the 60 year-old Tokyo-based Yanagicho Works, one of Toshiba's 27 domestic Japanese factories. Yanagicho Works is Toshiba's primary production facility for the manufacture of plain paper copiers, laser beam printers, optical disk drives, and various labor-saving devices such as mail sorting equipment, railroad turnpike ticketing systems, and automated teller machines. Of key importance to the book's arguments is that the factory is not just a manufacturing site. The factory is also responsible for R&D, design, engineering, quality assurance, marketing, and product planning. Fruin argues that a strategy of constant innovation and renewal at the factory level of organization has allowed Japanese firms to forge a unique industrial workplace that is at the heart of Japanese industrial success and value creation. In the brutally competitive electronics industries in which Toshiba competes, the factory as the strategic unit allows Toshiba to innovate and renew itself faster than in a conventional divisional organization.

The book is the product of extensive field work. Fruin spent more than a year actually working in the Yanagicho factory and even lived in a Toshiba dormitory for managers. The field work, combined with the author's extensive previous experience in studying Japanese organizations, provides the basis for new and important insights into Japanese manufacturing strategy. As Fruin points out, there have been only three prior books in English about manufacturing in Japan with a field work emphasis. The current book is sure to become a standard reference for students of Japanese organizations and in particular, for students of Japanese manufacturing.

Chapter 1 provides an overview of the factory, including some pictures of smiling Toshiba employees, and introduces the knowledge works construct. The term knowledge works is a translation of the term *kaihatsu kojo*, which is Toshiba's way of distinguishing this type of factory from mass production facilities that do little in the way of R&D or design. The knowledge works construct is developed with an emphasis on the tacit nature of factory knowledge and the interconnected roles of commitment, teamwork, know-how, and profit. Fruin also suggests that we cannot generalize from Toshiba's success to Japan's success (or in 1998, Japan's failure?). Chapter 2 presents the architecture of knowledge works along with discussions of variations on the basic model. Fruin distinguishes the knowledge works model from traditional M-form firms that neatly segregate corporate, divisional, and operational activities. In contrast, Yanagicho Works com-bines upstream and downstream functions and is almost like a corporate division. Chapter 3 describes Toshiba's total productivity campaigning, Toshiba's way of coping with the need for constant organizational renewal by making knowledge creation and innovation widely practiced and
predictable. Chapter 4 focuses on the role of suppliers. Between 73 and 83 percent of manufactured value from Yanagicho Works was sourced from suppliers. Chapter 5 looks at Yanagicho's product development system and the development of the world's first credit card-sized computer. Chapter 6 will be of primary interest to readers of the *Journal of International Business Studies*. This chapter describes the problems of taking the knowledge works model outside Japan. Finally, Chapter 7 summarizes the model and discusses why knowledge works first appeared in Japan.

One of the most important questions for international business is whether knowledge works is a cultural artifact of Japan. Fruin suggests this early in the book, but does not pursue the issue in great detail. Later, in Chapter 6, Fruin concludes that the model cannot be exported easily. However, this conclusion is qualified with the argument that firms in different industries, such as automobiles, may have more success in transferring their factories overseas. Perhaps Yanagicho Works is not a Japanese cultural artifact, but a Toshiba cultural artifact. Surprisingly, Fruin does not examine this issue in any detail. Nevertheless, Chapter 6 will be very interesting to scholars of Japanese multinational firms. Fruin describes the difficulties encountered by Toshiba in internationalizing manufacturing. Because Toshiba corporate planners did not understand the complexity of manufacturing, they were unable to provide for the effective transfer of key operational features and capabilities. The result is that while Toshiba has established international manufacturing plants, these have limited functional capabilities compared to Yanagicho Works, and are certainly not knowledge works. Chapter 6 also helps explain why United States firms struggle to learn from Japanese example (Inkpen, 1996 and Inkpen and Dinur, 1998). Given Toshiba's difficulties in imitating its own internal capabilities, it is hardly surprising that non-Japanese firms struggle to understand and learn from Japanese alliance partners.

One issue that was not dealt with thoroughly involves the extent to which knowledge works is the norm in Japan. Fruin implies throughout the book that he is dealing with a Japanese social and organizational innovation. Given that only one factory was studied, how do we know that knowledge works is found in other Japanese firms? While I suspect that a study of other top Japanese firms like Sony and Canon would reveal similar factory-based organizations, Fruin does not address this issue. As well, how do we know that knowledge works is not found in non-Japanese firms? For example, I would argue that Dell Computer embodies many of the knowledge works ideas in its operations, as do other U.S.-based firms in the computer industry. It would have been useful if Fruin had more carefully argued this critical point using other references. In addition, I would have liked to have seen a more detailed description of the research methodology beyond the one page in the preface.

As presented by Fruin, knowledge works factories would appear to be the basis for competitive advantage. Given that the knowledge works model is widespread in Japan, according to Fruin, and almost nonexistent elsewhere, Japanese firms should have the basis for unique value creation, which is at the heart of successful strategies. Fruin suggests that Japanese firms will sustain their outstanding performance for years to come. Unfortunately, the Japanese economy is in recession and Toshiba has seen sharp drops in profitability. Analysts have predicted that it could be several years before Toshiba begins to recover. This gets at one of my concerns. Fruin describes a construct, but not a theory. Although the knowledge works construct appears valid, how does it impact organizational performance? Fruin argues that knowledge works is vital to Toshiba's and Japanese firms' success, but given their current problems, where is the evidence? Fruin maintains that Japanese firms are unable to dismiss or lay off employees except in the most extreme circumstances. As we are now learning, this inflexibility and emphasis on employment stability, particularly at management levels, is hurting Japanese firms dearly. Fruin argues that knowledge works factories are unique to Japan as repositories of diverse skills. What we do not know, beyond speculation, is how these factories contribute to organizational performance. In other words, there is no theory associated with knowledge works and organizational performance.

An issue that is critical to Toshiba and other multinational firms is the transfer of knowledge and best practices within the organization. The ability to transfer knowledge from one part of the organization to another is the essence of global integration. Fruin provides some discussion of how Toshiba affiliates share productivity practices, but little examination of how Toshiba's factories share strategic knowledge. Granted, Fruin's research focus and methodology were not designed to address this question. However, based on the discussion of Yanagicho Works' culture, my conclusion is that Toshiba is probably not very successful at transferring knowledge across divisions and factories. As Fruin makes clear, at the factory level there is a unique culture and world view, suggesting knowledge will be very sticky, highly embedded, and very difficult to transfer.

In summary, Fruin provides an excellent description of a globally competitive Japanese factory that should be of great interest to both practitioners and organizational theorists. My own view is consistent with Fruin's arguments: The knowledge works model
will be the basis for future Japanese competitive success. The Japanese economy may be in trouble and many Japanese firms must restructure. However, firms such as Toyota, Sony, and Toshiba (one side of the two Japans) have decades of experience in building unique manufacturing organizations based on constant renewal, innovation, and transformation. These and other firms may experience some short-term gyrations in profitability but, I predict, will emerge from the problems of the late 1990s even stronger than ever. Managers in Western competitors would be well advised to read Knowledge Works if they want to begin to understand Japanese organizations and why Japanese manufacturing skills are truly unique. Interestingly, in a recent issue of The Economist (1998), an argument is presented that the health of a manufacturer is based on the speed of raw material turnover and its conversion into finished goods. Fruin, of course, would argue that this type of thinking should be associated with mass production, not innovation and organizational renewal. If Western managers cannot get beyond raw material turnover as the key performance indicator of manufacturing facilities, Japanese firms like Toshiba should have little trouble sustaining their position among a small set of leading global companies.

References


