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Book Review

Probing a 'Prepared Organization': Reading Takahiro Fujimoto's *The Evolution of a Manufacturing System at Toyota*, Winner of the 2002 Japan Academy Prize

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Abstract: Takahiro Fujimoto's 1999 book, *The Evolution of a Manufacturing System at Toyota*, is surveyed and its contents introduced to commemorate the book having been awarded the prestigious Japan Academy Prize for 2002.

Keyword: capability building, organizational learning, system emergence

1. Japan Academy Prize

Takahiro Fujimoto has been recognized as a leading authority on technology and the world automobile industry since his landmark 1991 book, *Product Development Performance*, co-authored with current Dean of Harvard Business School, Kim B. Clark. In June 2002, Fujimoto's latest full work, *The Evolution of a Manufacturing System at Toyota* (1999, Oxford University Press), was awarded the Japan Academy Prize, in the presence of Their Majesties the Emperor and the Empress of Japan. On the occasion of the book having received this high recognition, it seemed fitting to consider again the contributions of the work and introduce its contents to those who may not yet be familiar with it.

2. What's Inside

The Evolution of a Manufacturing System at Toyota was written approximately two years after its Japanese language counterpart. As such, the English version contains numerous refinements and changes as compared to the Japanese text. Most notably, the English version features a deeper grounding and connection to the academic literature on organizational learning. The book has received highly positive reviews by academic journals both in

Japan and abroad. For example, Tom Roehl reviewed the book for the *Academy of Management Review* (2000, Vol. 25, No. 2, pp. 439-441) and strongly recommend the work for the long-term historical view it offers of Toyota's rise to become a dominant player in the auto industry. Roehl also called the work an "important conceptual contribution…to our understanding of the evolution of systems within firms" (p. 439).

The book is divided into two major parts. Part One gives an overview of how the Toyota manufacturing system emerged and shows why an evolutionary framework applies. A compact and highly readable history of the Japanese auto industry is also included. The book's various theoretical contributions include an informational perspective introduced in Chapter Four, which allows for a surprisingly straightforward functional description of the extremely complex system of overlapping practices and techniques that make up Toyota's manufacturing system.

Part Two elaborates on the three key pillars of the Toyota manufacturing system: black box parts supply, product development, and assembly, with chapters containing detailed functional and genetic description of each. In addition, there are also two useful appendixes. The first briefly outlines the evolutionary perspective Fujimoto adopts in the book. The second appendix presents both an overview of the practices and techniques that make up Toyota Manufacturing System and a summary of empirical findings on the overall system's performance.

The book is addressed to practitioners and a diverse array of academic audiences, from organizational and technology management theorists to micro and applied economists. Even researchers of developmental economics will be intrigued by Fujimoto's analysis of how Toyota engaged in *forward adaptation* (p. 50-51) through the 1960s to motivate the building up the firm's capabilities to face what it perceived as inevitable future international competition. Such firm conduct would seem to be just what infant industry policies generally aim for.

3. Evolutionary Learning Capability

While it is impossible to do justice to the richness of detail and argument found in Fujimoto's book in just a few paragraphs, a short summary of the work's principal argument is presented here.

Fujimoto's book provides an empirically grounded look at a classic question: What is the real source of lasting competence for a manufacturing company? In analyzing Toyota, a firm that has persistently outperformed its rivals for over 30 years, Fujimoto engages in the most comprehensive study to date in addressing this research question vis-à-vis this leading Japanese firm. The author's in-depth research of Toyota since 1979 gives him a unique background from which to examine how the firm's total manufacturing system (product development, supplier management, and assembly) has developed and been exploited by the firm over an extended

period of time.

The conclusion Fujimoto reaches is that, at least through the early 1990s, Toyota has somehow been able to "know" how to handle the complex process of system emergence and engage in organizational learning regardless of the circumstances the firm faced. In order to build its manufacturing system, Toyota has needed to be able to "learn anyway" because the system is not simply the result of rational calculation by firm management, as the company tends to portray it and many mistakenly tend to believe. Fujimoto shows in fine detail that Toyota's total manufacturing system emerged (and continues to develop) through a multi-path process made up not only of rational calculation, but also pressures from environmental constraints; inspiration of entrepreneurial vision; unanticipated knowledge transfers from outside the firm; and even random trials. What Toyota has been able to do better than its rivals is harness solutions that emerge through these various paths in order to build up its manufacturing capability.

Using detailed examples, Fujimoto offers a theoretical framework to illustrate how Toyota has been able to learn as it has. It involves the firm engaging in dual-level problem solving. A lower level generates various solutions to problems that arise in a manufacturing system. A higher level then selects, refines, and integrates those solutions that can contribute to the development of new competitive capabilities. The lower-level problem solving can be viewed as intentional, or before-the-fact, learning. The higher-level problem solving can be viewed as opportunistic, or after-the-fact, learning. Fujimoto notes that these two levels of learning have some overlap with the concept of higher-order learning for changing organizational values and learning routines found in Argyris and Schon (1996) and Fiol and Lyles (1985). While we would expect an intentional learning capability to be present to a degree in any firm with leading manufacturing capabilities, it is rarer for the higher-level learning to be present. It is rarer still for a company to posses such a capability over a period of decades as Fujimoto shows Toyota has done.

Thus, returning to the classic question posed above, Fujimoto argues the source of lasting competence for a manufacturing company goes beyond possessing a competitive *routinized manufacturing capability* and a competitive *routinized learning capability* (i.e., superior lower-level problem solving), although both of these are necessary factors. On top of these two capabilities, a firm must also posses an *evolutionary learning capability* (i.e., superior higher-level problem solving).

4. Toyota as a 'Prepared Organization'

The above discussion begs the question of what exactly makes up an evolutionary learning capability, or what enables a firm to develop such a capability. As Fujimoto readily admits, this line of inquiry would require a separate systematic investigation and goes beyond the scope of his book. Nevertheless,

he does offer some initial directions.

Fujimoto describes Toyota with its evolutionary learning capability as a 'prepared organization.' As the inspirational source of this phrase, Fujimoto cites a discussion with David Hounshell and the influence of a Cohen and Levinthal (1994) paper titled, "Fortune Favors the Prepared Firm." Needless to say, this paper title is derived from the famous quote by the father of bacteriology, Louis Pasteur (1822-1895), that "fortune favors the prepared mind," a phrase Pasteur is said to have coined as a retort to scientists who said his discovery of pasteurization was simply due to luck.

Fujimoto suggests that a source of the "preparedness" of Toyota may be that people at Toyota share certain values and a "competition-consciousness" that guide decision-making. The cumulative result of the many individual decisions related to manufacturing made by shop-floor workers, supervisors, engineers, and managers at Toyota is that those manufacturing routines that are ultimately selected, retained, and developed into new competitive capabilities are only those that succeed in making "some informational contribution that enhances the impact of the ultimate information—the one embodied in products and delivered to customers" (p. 275). Further investigation by Fujimoto and others into the workings of a 'prepared organization' is eagerly anticipated.

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