

Knowledge and Competitive Advantage: The Coevolution of Firms, Technology, and National Institutions. By *Johann Peter Murmann*. Cambridge, U.K.: Cambridge University Press, 2003. xxi + 294 pp. Tables, figures, appendix, bibliography, notes, index. Cloth, \$60.00. ISBN: 0-521-81329-8.

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Why was the German dyestuffs industry so successful prior to the First World War? Why did some companies manage to conquer the world market, while others failed? What advantages benefited German companies that were not shared by their English and American competitors? Johann Peter Murmann uses the “theory of coevolution” to answer these questions. In addition to providing case studies, he drafts an impressive history of German technology and business and compares the German dyestuff industry with that of Britain and the United States.

Previous analyses of competitive advantages have been conducted at the national and industrial levels. Economists have based their explanations of Germany’s success in forming a dyestuffs industry on theoretical models that have focused on technical developments, educational systems, and other influences but have neglected the role of the individual firm and have overlooked the institutional context. Murmann has set out “to integrate the existing theories that emphasize either environmental or firm-level factors into a comprehensive framework” (p. 198).

Rather than consulting archival material, he has drawn from a broad array of existing studies. He begins the book by describing how institutional frameworks differ in Germany, Britain, and the United States. In subsequent chapters, he presents two case studies of firms from each of the three countries and analyzes them according to the theory of coevolution, a biological term that he applies to answer the question of why complementary institutional structures develop within a single country and to explain how these institutions influence the likelihood that a particular industry will experience dynamic growth. He concludes with an outline of his “institutional theory of competitive advantage.” An appendix supplies details on technological progress in the dyestuffs industry and on the data he compiled for this study.

While warning of the pitfalls of applying a biological term to socioscientific or economic arguments, Murmann nevertheless uses the concept to explain how “two evolving populations coevolve if and only if they both have a significant causal impact on each other’s ability to persist” (p. 210). A coevolutionary relationship, accordingly, can either increase or decrease the fitness of both populations (as in the case of mutualism and competition) or have a positive impact on the one and a negative impact on the other (as in predation and parasitism). This outcome can be demonstrated in the parallel and mutually supportive rise of industry, technology, and the university system.

On the firm level, coevolution requires companies to develop the abilities and strategies they need for adapting to, and even molding, their institutional environment. Their efforts raise further questions on the scope and limits of business activities, routines, and learning processes against the background of changing environmental factors.

The question remains, Which institutions contributed to the success of industries and individual firms in the dyestuffs industries in Germany, Great Britain, and the United States? Which processes led to Germany’s domination of the industry before the First World War? Murmann highlights the mutual relations between individual companies and institutions such as the patent office, firms engaged in research and design, and educational systems. By 1877 Germany had an effective patent office, impressive universities, and advanced polytechnic and business schools, whose pool of highly qualified employees closely cooperated with the research-and-development departments of individual companies. Scientific networks provided the German system with a number of advantages. Thus, empirical differences in institutional development help to explain why Great Britain, which failed to build comparable institutions, lost out to Germany and, by the mid-nineteenth century, had lost its position as the leading industrial nation in dyestuffs. Similarly, its failure to develop comparable institutions explains why the United States played only a subordinate role in this sector up to the First World War. Murmann compares the institutional networks and company strategies of firms from the three nations, including Bayer, Levinstein, and Schoellkopf, to demonstrate the differences in national approaches to coevolution.

Like the New Institutional Economics, coevolutionary theory considers the impact of institutions on the historical development of firms and stresses the causal links between industrial, technological, and institutional dynamics. When it is combined with close observation of a number of firms, the theory has the potential to reveal how competitive leadership practices are gained and lost over time. Murmann's book is a convincing comparative economic and business history that is likely to inspire further empirical studies.

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