

Book review

François Texier: Industrial diversification and innovation. An international study of the aerospace industry. Edward Elgar, Cheltenham Northampton, MA, 2000, 288 pp., £ 55.00, \$ 90.00, ISBN 1840644524

Many studies in the economics of technical change have focused on the technological and industrial development of the aircraft industry. What is more, an important number of evolutionary concepts originated from insights in the history of the aircraft industry, including learning-by-doing, scaling, technological trajectory, and technological paradigms. One may thus consider the aircraft industry as an important “exemplar” of evolutionary explanations of technological development. However, relatively few researchers have attempted to understand the full complexity of the aircraft industry using a case-study approach. The present book is an exception. Based on a variety of written sources and interviews, the author covers the aircraft diversification strategies of three firms: the French firm Dassault, the Swedish firm Saab, and the South-Korean firm Daewoo.

The central goal of the book is to understand why and how diversification strategies have been implemented in these three aircraft firms. The theoretical explanations identify internal and external factors. Following resource-based approaches, internal factors concern growth strategies, realizing market opportunities, and exploiting economies of scope. External factors include responses to institutional changes such as government policy, and the benefits associated with risk spreading due to uncertainties. It is the latter factor that is often emphasized in the aircraft industry in which demand is cyclical in nature. The importance of a constant flow of production activity is to maintain learning-by-doing efficiencies that tend to be forgotten when production halts.

Texier makes clear that though his analysis focuses on firm strategy, special emphasis must be given to the (national) institutional environment. The literature on national systems of innovation suggests that interests, rules, and policies of governmental organizations affect the decision and implementation of diversification strategies of firms as well as their success. This broader point of departure is indeed logical when studying the aircraft industry, considering the strategic importance of the aircraft sector for a nation’s political independence and industrial knowledge base.

The main part of the book is devoted to the reconstruction of the diversification strategies of the three firms. In all cases, a new aircraft was developed in an attempt to enter a new market. Dassault, formerly a producer of military aircraft

only, developed a twinjet business aircraft in the early sixties called the Mystère-Falcon 20. In the Saab case, diversification from military production took place in the late seventies and early eighties, with the development of the Saab 340, a twin-turboprop regional aircraft designed to serve the American market. Daewoo developed its very first aircraft in the early nineties, a single-turboprop military trainer called the KTX-1 “Woong Bee”, which marked the entry of Daewoo as an aircraft developer.

The three case-studies reveal many interesting facets of design, user-producer interactions, inter-firm collaborations, the certification process, and marketing strategy. Furthermore, the national context is described for all cases. Particularly interesting in Texier’s discussion is the exposition on industry-government relations in Korea, which has been very little researched. I will only highlight three observations, which I found particularly interesting and which proved relevant in all three cases.

First, concerning the design process, all three firms pursued a careful step-by-step approach relying as much as possible on previous design solutions and production competencies. In the case of Dassault, this strategy was even explicitly formulated as the “small-steps policy” (p. 78). This policy basically meant that a major change in one subsystem was only allowed to take place when conventional solutions were chosen for the other subsystems. The incremental design strategies of all three firms may not be surprising to those more familiar to the aircraft industry, but they are theoretically important to the local nature of problem-solving, which is a central theme in evolutionary economics. The incremental nature of product development also reveals a strategy to exploit economies of scope.

Second, the management of the certification process has contributed greatly to the commercial success of Dassault’s business jet and Saab’s regional aircraft. The certification process of civil aircraft was non-trivial to these former military firms, as in both cases military technology had been transferred to a civil design. Both firms used their partnerships with American firms to realize American certification, which was necessary to launch the product in the world’s biggest market. Dassault managed to get certification rather quickly by using the competencies of Boeing engineers. These engineers were available via Dassault’s prime customer Pan Am, as Boeing was the prime aircraft producer for Pan Am. Saab also realized the importance of gaining American certification. To this end Saab joined a transatlantic program, which aimed to standardize certification between Europe and the US. Being the first to be certified in this program, Saab succeeded in pulling competencies from this program required for certification.

Third, Texier describes the difficulties in the management of inter-firm collaboration in the development of aircraft. Saab and Daewoo collaborated primarily horizontally with other aircraft firms to complement their competencies in design (Saab with the American firm Fairchild, and Daewoo with the Swiss firm Pilatus). The problems between Saab and Fairchild arose from conflicting management styles, with the American management being hierarchical and top-down and the Swedish management being more decentralized and bottom-up. In the case of

Daewoo and Pilatus, problems arose from conflicts of interests: Where Pilatus as market leader in trainer aircraft basically wanted to sell its existing design solutions, Daewoo always wanted to pursue an own design and expected Pilatus to transfer knowledge rather than solutions. In contrast to the cases of Saab and Daewoo, Dassault mainly cooperated vertically with its prime customer, Pan Am. Pan Am aimed to become an intermediary sales company of business jets in the US. The partnership proved a good match, since Pan Am was knowledgeable of commercial aspects of (business) jets and could help Dassault in meeting the institutional requirements following from state policies. It may not be coincidental that horizontal collaboration proved more difficult than vertical collaboration, though Texier does not investigate these differences.

After the detailed reconstruction of the diversification strategies of the three firms, Texier analyzes the three case studies within the theoretical framework on diversification. In this framework, many factors affecting the decision and implementation of diversification are addressed, most of which prove more or less relevant in two or three cases. However, some factors prove to be highly important in all cases. The first important result holds that, although many factors come into play, external market opportunities seem to have been the main motivation in the cases studied. These opportunities were created by the emergent niches for business jets in the fifties and for regional jets in the eighties. The anticipation of the growth of these niches coupled with the conventional cost economies of the firm largely explains why these firms diversified. The second important result holds that the relevant unit of analysis is clearly the “sectoral system of innovation” rather than the “national system of innovation”. In all cases, crucial resources were pulled from inter-firm collaborations, while interactions between firms and national institutions were of minor importance for the success of the program. In this context, Texier points to the fact that, in all three cases, diverging interests between ministries and the firm initially blocked the firm’s diversification strategy. Only at a later stage, when the market potential became evident (Dassault) or political coalitions had changed (Sweden), did the government take on a more facilitating role in providing financial support.

Texier also analyzes the different types of learning of the three firms. Here the author makes a useful distinction between learning about technologies, markets, finance, management and organization, and institutions. In all types of learning, the management of relations with other organizations proved crucial in realizing the project. In the final chapter, Texier lists a number of implications for public policy and for firms’ strategies aiming at diversification. These implications are carefully derived from the foregoing analysis and may prove useful for policy makers and business managers. Unfortunately, Texier does not go into the theoretical implications of his study for the theory of the firm and for the systems of innovation framework. The absence of such a discussion is surprising in light of his motivation to do case-study research to “promote theoretical developments in the field of investigation” (p. 54).

The study by Texier is worthwhile reading for anyone interested the history of the aircraft industry, as well as for students of innovation studies in general.

The study provides exciting histories of three product innovation programs. What is more, covering three countries, three market segments, and three time periods, Texier has succeeded in telling a bigger story. Analyzed through the eyes of individual firms, the general issues of the post-war aircraft history are addressed, which are of relevance to other sectors. These issues concern (i) the importance of anticipating new niches for firms in diversifying their product portfolio, (ii) the importance of both horizontal and vertical inter-firm collaboration in design, certification, marketing, and production, and (iii) the transition from nation-based innovation systems to international sector-based innovation networks.

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