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GIOVANNI DOSI, RICHARD R. NELSON and SIDNEY G. WINTER (eds), *The nature and dynamics of organizational capabilities* (Oxford: Oxford University Press, 2002. Pp. xiii+404. P/back ISBN 0 19 924854 0, £22.99).

How are the capabilities of organisations developed and maintained? This edited book explores the processes that link the antecedents of these 'complex and even somewhat mysterious' social phenomena, to differential performance outcomes achieved over time. The book takes the form of an edited collection comprising thirteen chapters, most of which present detailed empirical findings. The chapters are organised around particular conceptual issues, including the development of new capabilities, the 'evolution' of capabilities and their 'social roots' in specific contexts. Accordingly, they probe both within and beyond the formal boundaries of the organisation in pursuit of these elusive themes. While some of the material has been published elsewhere, a text of this kind allows the reader to obtain a rapid overview of the literature under the guidance of leading scholars, who straddle the fields of economics, strategic management and innovation. For the business historian, it provides a timely update on a research agenda identified by Charles Harvey and George Jones in a special issue of this journal (Vol 34, Issue 1, January 1992).

The editors' introductory chapter is an appraisal of the concept of organizational capability. It seeks to establish common points of reference, and aims to locate the editor's interpretation of the term in relation to the distinct research agendas of evolutionary economics, strategic management, business history and strategic management. They begin with a characteristic definitional problem:

'The term "capabilities" floats in the literature like an iceberg in a foggy Arctic sea, one iceberg among many, not easily recognized as different from several icebergs near by.' (Dosi *et al.* (2002: 3)

Undaunted, they probe the murky interface between 'capabilities' and 'routines'. Capabilities and skills are identified on the basis of intentionality; they arise where an individual or organisational actor has, 'a generally reliable capacity to bring that thing about as a result of intended action.' (*ibid*: 2). Intentionality is most reliably displayed during the building of capabilities, but the process can also become automatic, when capabilities are reproduced through the 'repetitive daily business' of the organisation. On the other hand, 'the notion of a routine does not *exclude* the possibility of conscious decisions about exercise. Hence, some routines may appropriately be called capabilities, if they satisfy the other criteria.' (*ibid*: 4 – emphasis in original). The editors reserve the term 'skills' for the individual level and 'capabilities' for the organisational level, while noting that this convention is often violated in the literature. To their great credit, they recognise some personal failings in this respect. Thus, having acknowledged that Nelson and Winter (1982: 100) 'slipped' into using 'routines' when referring to individual-level activity, they vow to do better in future: 'Transgressions of this kind will no doubt continue, but, we hope, not by us' (*ibid*: 5).

This book is one outcome from an extensive and collaborative research effort, originating at the International Institute for Applied System Analysis (IIASA) as part of the *Technological and Economic Dynamics* (TED) project. The resulting emphasis on applied 'high' technology sector studies (with two exceptions) may prove disappointing to those seeking a broader review of capabilities.

However, the advantage is that the chapters combine to provide a fairly coherent and focused empirical basis for exploring these concepts. Part I is concerned with the micro-mechanisms that generate particular capabilities. Chapter 1, by Narduzzo, Rocco and Warglien assesses the conceptualisation of capabilities as 'bundles of routines' in the context of a case-based analysis of a cellular phone company. It concludes that organisational capabilities are much more than mere collections of routines, highlighting the mediating role of the interpretive schemes and co-ordinating architectures. Chapter 2, by Argote and Darr, reports a study of knowledge transfer in pizza franchises, which adopts an unusual combination qualitative evidence and formal modelling in a context of rapid knowledge 'depreciation' arising from high staff turnover rather than innovation. In Chapter 3, Szulanski investigates the mechanisms that enable routines to be replicated among newly-acquired members of a banking group. This highly detailed account points out both the potential benefits of replication and the inherent trade-offs. As the author notes, 'there may be inherent limits to the routinization of replication', requiring a degree of managerial judgement that is absent from some evolutionary interpretations. This theme is pursued by Flaherty in Chapter 4, which looks at processes of intelligent adaptation in U.S. semiconductor manufacturers, highlighting the paradoxical effects of an organisation's 'limits on inquiry', under different competitive conditions. Part II is concerned with the development of new capabilities. Two chapters are located in the pharmaceuticals industry; a qualitative study by Pisano in Chapter 5 is matched by Henderson and Cockburn's statistical analysis in Chapter 6. Chapter 7, by Appleyard *et al.*, examines the development and transfer of process technologies in semiconductor manufacturing. The editors' comments on these chapters are particularly insightful. They note that each study provides evidence of both the explicit, articulated and the tacit, sometimes 'subconscious' dimensions of organisation capability:

'And we, the editors of this volume, come away from reading these studies with the perception that, in none of the cases, did the firms involved completely understand what they were doing, at least at a relatively fine level of implementation.' (*ibid*: 127)

For the editors, this realisation supports a broadly evolutionary interpretation. In Part III, attention turns to car manufacturing. In Chapter 8, Coriat's historical comparison between US and Japanese organisational practice exemplifies the 'social roots' of capabilities and also extends the Nelson and Winter concept of routines to consider their role as governance structures. In Chapter 9, Fujimoto applies his useful distinction between (dynamic, routine) 'improvement capabilities' and (dynamic, non-routine) 'evolutionary capabilities' to analyse more recent changes in the Toyota production system, as reported in the previous chapter. This strong evolutionary framework aims to open up what the author describes as the 'black box' called dynamic capability. Chapter 10, by Florida and Kenney, tackles the transfer and replication of capabilities in Japanese transplant firms through a combination of questionnaire surveys and field research. The authors' findings are presented as a challenge to industrial sociology and organisation theories that imply strong contextual constraints on replication. Part IV concludes the text with a summary of the major contributions of capabilities research. Chapter 11, by Patel and Pavitt, emphasises the role of firm-specific technological competencies, showing that these are much more diverse than production-related competencies, and tracing some of the broad continuities and changes over two decades. In Chapter 12, Teece *et al.*, present their familiar 'dynamic capabilities' concept. Lastly, in Chapter 13 Levinthal presents a rather involved thesis, which focuses on the potential application of recent work on fitness

landscapes to explain organisation-level adaptation. In so doing, he elaborates on Arthur Stinchcombe's classic (1965) statement concerning the persistent effect of founding conditions.

There are two significant omissions in an otherwise excellent text. The first is concerned with intellectual roots. When referring to Edith Penrose's pioneering contribution, *The Theory of the Growth of the Firm* (Oxford, 1959), writers are often guilty of conflating her crucial argument regarding the 'productive resources' and 'productive services' dynamic. The result is that insufficient recognition is given to Penrose's distinctive insights into the creation of firm-specific capabilities. George Richardson's famous (1972) paper 'The Organisation of Industry' is an important link in the story; the editors acknowledge it as, 'the original use of the term "capabilities" in a sense closely akin, if not identical, to our own.' (*ibid*: 7), but do not record how Richardson's understanding of capabilities drew explicitly on the productive services of 'Mrs Penrose'. The second omission relates to the scope of the empirical research. More specifically, despite the editors' perceptive commentaries (and with a few notable exceptions), the contributions offer a surprisingly muted account of capabilities as idiosyncratic, opaque, situated and 'unbiddable' phenomena. This may be a product of the book's disciplinary mix, in which strategic management and evolutionary economics play the most prominent role. Readers who find parts of it too prescriptive or reductive might be recommended a more balanced diet, incorporating some of the more historically and spatially-informed studies that are to be found in journals such as *Business History*, or in research monographs.

The nature and dynamics of organizational capabilities is an important addition to the literature, in which conceptual discussion is supported by a fairly wide-ranging survey of recent empirical research. The editors' opening contribution and brief introductions to the four main sections are well-signposted and insightful, giving it additional potential as a useful 'reader' for advanced undergraduate and postgraduate audiences.

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