
INTRODUCTION: WHAT DO WE KNOW ABOUT INDUSTRIAL DYNAMICS?

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Today, industrial dynamics is considered to be among the most interesting and rewarding fields of research. There are various reasons for this. Firstly, innovation, as an economic phenomenon that transforms industries in an endogenous manner, is at the core of industrial dynamics approaches, and at the same time is one of the key challenges for a growing part of the scientific community (Antonelli, 2003; Saviotti, 1996; Amendola and Gaffard, 1988). Secondly, as a result of the increasing ability of economists to work on long term series and analyse complex systems, there are new opportunities to capture and measure regularities in the processes of industry evolution (Foster and Hölzl, 2004; Pyka and Hanusch, 2006; Witt, 2003). Thirdly, models of industrial dynamics, supported by empirical evidence, allow for the existence of heterogeneity in the characteristics of firms within an industry in terms of size, entry/exit, performance, innovation strategies, etc. (Malerba and Orsenigo, 1996; Audretsch, 1995; Acs and Audretsch, 2005). Fourthly, industrial dynamics approaches are uncovering new evidence about how firms compete and how competition should operate, that is in sharp contrast with the results of more basic industrial organization studies (Sutton, 1998; Baumol, 2001; Geroski, 1991).

For a long time, industrial dynamics encompassed the study of the different variables characterizing industries (such as entry/exit, penetration rate, innovation rate, R&D expenses, number of patents), and their

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comparison from one period to another (Bresnahan and Schmalensee, 1987). Though these initial developments included important elements related to the quantitative functioning of industries, it is now largely accepted that these early contributions often neglected the genuine determinants of the evolution of innovative industries (Lazonick, 1991; Fransman, 2006). The renewed interest in industrial dynamics from the late 1990s has been accompanied by a redefinition of the domain: industrial dynamics involves the study of how activities within an industry are distributed amongst firms ; industrial dynamics also involves analysis of why and how some firms are occupied in a wide range of activities while others are more specialized ; industrial dynamics also includes study of the degree of vertical integration among firms and how changes in it impact on the evolution of the industry. Industrial dynamics, therefore, not only describes and analyses how an industry is currently organized, but also how it differs from earlier periods, what forces have acted to bring about this reorganization of the industry, and how these forces have been changing over time (Krafft, 2004a, 2004b; Dietrich, 2006). The study of industrial dynamics demands a permanent and sound connection between facts and theories. The stimulus provided by the patterns, puzzles and anomalies revealed by systematic data gathering and careful collection of detailed information is essential for improving understanding of the forces that determine the dynamics of industry. Methods of analyses have evolved that favour these new orientations. Researchers concentrate on the collection of a wide spectrum of data (quantitative and qualitative) that allow initial determination of major stylized facts and regularities related to the evolution of industries followed by an elaboration and comprehensive analysis of how innovative industries contribute to economic change (Dosi and Malerba, 2002; Klepper, 1997, 2002).

The major objective of this part of the special issue is to provide an overview of the current knowledge about industrial dynamics, its main outcomes and future challenges. The papers in this special issue aim to characterize the advances in industrial dynamics, and identify the limitations of this research and the new domains that remain to be explored.

The first paper is by Franco Malerba who characterizes the major progress that has been made, and how the research agenda has evolved most recently. His contribution is driven by the idea that although initially two distinct traditions have emerged— one centred on firms' entry, survival and growth; the other on institutions and knowledge— a progressive convergence is beginning to occur. This convergence is both attractive and enabled by the specificities of industrial dynamics in systematically articulating theoretical advances and empirical results.

The advances in industrial dynamics are numerous. The most robust is certainly that many industrial sectors have a life cycle, that is, that they are sequentially engaged in a phase of emergence, growth, maturity, decline and death. But there are also some limits, and these are also discussed in

this special issue. Guido Buenstorf and Ulrich Witt claim that the argument in the industry life cycle literature that older and larger firms (the first movers) displace younger and smaller firms does not always hold. When firm growth is taken into account, and the traditional technological focus of industry life cycle is complemented by organisational problems, it is possible to conceive of new entrants outperforming diversified firms, and even of incumbents exiting prematurely while latecomers survive. Thomas Grebel, Jackie Krafft and Paolo Saviotti advocate that much of the existing research into industry life cycles relates to industries that appeared during the first half of the 20th century and are thus now mature. Since that time, new phenomena have emerged which are shaping the evolution profiles of the modern industries that are often termed knowledge-intensive. These new phenomena include the survival of incumbents, and the regular entry of new firms and their eventual co-existence within networks of innovation. Evidence drawn from the telecommunications and biotechnology industries suggests that industry life cycle models should be modified to account for these new phenomena. David Audretsch and William Baldwin in their paper concentrate on these knowledge intensive industries. They review how public policies, and especially competition policy in the US, have been modulated over time, reflecting a change in the traditional economic models. In the early days of the 20th century, models of industrial organisation based on the interaction between the traditional factors of production (labour and capital) dominated; today, new industrial dynamics models based on how the creation of knowledge contributes to economic growth constitute the key reference. Mario Amendola, Jean-Luc Gaffard and Patrick Musso investigate a related topic— the interaction between innovation, productivity gains and market structure evolution. They show that innovation success does not primarily depend on the properties of technology. Rather, innovation generates productivity gains only if, after the break up of the prevailing market structure, a certain level of stability is restored, which is necessary for the coordination of activities within and among firms.

This special issue also aims to emphasise that the development of the field of industrial dynamics is grounded in its openness to new questions, and its capacity to relate unconnected, yet complementary fields of research. Steven Klepper investigates the determinants of the geographic structure of new industries, thereby making the link between industrial dynamics and economic geography. Based on empirical investigations into the television, automobile, and tyre industries, he discusses the agglomeration effects often claimed in the literature. In these three industries, which are characterized either by a concentration of firms in areas where production was initially negligible, or by a progressive dispersion of firms leaving formerly highly concentrated areas, the agglomeration effect does not apply. To explain this, he proposes a hypothesis based on the ideas of organisational birth and heredity. In the final paper in this collection, Mariana Mazzucato explores the possible link

between industrial dynamics and financial dynamics. Her argument, somewhat novel in the literature despite growing empirical support for it, is that stock price volatility is fundamentally linked to the real (not imaginary) structure of technological change during industry evolution. In fact, in major industries of the old and new economy, growth rates and stock prices were the most volatile in those decades when innovation was the most radical, with new competences being created and older ones destroyed.

I want to close this introduction by noting that the title of the special issue is inspired by a famous article “What do we know about entry?”, written by the late Professor Geroski and published in 1995 in the *International Journal of Industrial Organization*. Professor Geroski was one of the leading scholars in the field. He expressed his views on the development of the research agenda in industrial dynamics with the utmost clarity.

He died on August 28, 2005.

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