

**RECENT TRENDS IN THE
ECONOMICS OF INNOVATION
LITERATURE THROUGH THE
LENS OF INDUSTRIAL AND
CORPORATE CHANGE**

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Recent trends in the economics of innovation literature through the lens of Industrial and Corporate Change

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Abstract.

Literature on the economics of innovation has been in constant change. We quantitatively assess recent trends in this literature in terms of research topics and types of research. Departing from a comprehensive qualitative and quantitative survey of influential innovation handbooks, this paper draws on the review and analysis of all articles published in *Industrial and Corporate Change*, since its foundation to 2009. Our results reveal that ‘Conceptual/Economic Thought’, ‘Intellectual Property Rights’, and ‘Measurement of Innovation’ topics have shown striking trends over the period in analysis. Moreover, although both ‘Appreciative plus Empirical’ and ‘Formal plus Empirical’ types of research have grown, suggesting a ‘virtuous’ trend towards the analytical and predictive efficacy of theory, purely ‘Empirical’ studies have markedly increased, which may indicate that a connection between theory and empirics is (increasingly) lacking in the field of the economics of innovation.

Keywords. Economics of Innovation, Methodology, Bibliometrics

JEL Codes. O31, B41, C89

1. Introduction

The field of the economics of innovation traditionally deals with the allocation of resources and economic effects associated with innovation as an activity. During the last few decades, it has relied heavily on knowledge from distinct fields of specialization, such as Innovation and Growth, Innovation and Competition, Innovation and Knowledge, and Innovation within Evolving Systems (Antonelli, 2009).

In the literature on the economics of innovation, there is a continuing debate on the adequacy of the neoclassical theory in guiding decision-makers and researchers in their analyses. The main arguments stem from proponents of the so-called evolutionary theory. Important arguments include Nelson and Winter's (1977) critique about 'useful theory of innovation' and Dosi et al.'s (1988) critique on the limitations of neoclassical theory in the analysis of dynamic and complex economic evidence.¹ Nelson and Winter (1977) examined the adequacy of existing theories about innovation, markedly neoclassical, in order to guide innovation policy. They concluded that existing theories needed to bring in greater analytical and predictive faculties if these theories were to be useful in providing policy advice. Dosi et al. (1988) have argued that in general the hypotheses embodied in neoclassical theories (e.g., equilibrium) present strong restrictions in analyzing innovation at the firm, industry, or country level. Regardless of whether this debate has led to some degree of consensus, it should still be acknowledged that it has highlighted analytical and predictive efficacy as goals for the theories developed in the field of the economics of innovation.

The main purpose of this paper is to quantitatively assess recent changes in the economics of innovation literature in terms of research topics and types of research (e.g., formal, and empirical). This assessment is performed through a bibliometric analysis of the total number of articles published in the *Industrial and Corporate Change* journal (ICC hereafter) since it was founded in 1992 to August 2009. The analysis of the types of research identified is further intended to encourage reflection on the field's theoretical progress on the basis of analytical and predictive efficacy.

The methodology underlying the analysis is similar to that of Silva and Teixeira (2008, 2009) and Cruz and Teixeira (2010). It differs from these latter works, however, on the way the 'seed' journal (ICC) was selected. The selection procedure was based on an exploratory bibliometric exercise drawing on all (over one thousand) citations/references to refereed

¹ Dosi and Nelson (2010), Teece (2010) and Soete et al. (2010) represent more recent critiques. These works explicitly take the limitations of neoclassical theory as their starting point.

journal articles in seminal handbooks in the field of the economics of innovation from which ICC emerged as the most important economic related journal.

This paper is structured as follows. The next section puts forward a classification of the main research topics in the field of economics of innovation. This is followed by a description of the selection procedure of ICC and the bibliometric analysis. Section 4 details the evidence of changes in the field by research topics and types of research. We then conclude with a discussion of the main findings.

2. Defining the main research topics in the field of economics of innovation

Influential handbooks covering the economics of innovation includes key collective and individual studies such as Dosi et al. (1988), Freeman (1990), Dodgson and Rothwell (1994), and Fagerberg et al. (2006). Taken together, these volumes comprise 108 different chapters/papers. After a careful reading, we clustered the various chapters/papers deemed as a main research theme/topic in the field. The topics derived were then classified.² In what follows, we briefly describe what is included under each of the topics identified.

Innovation in Firms. Studies in this topic focus on individual firm-specific inputs essential to the innovation process. With few relevant exceptions (e.g., R&D), these inputs are in general non-tradable and difficult to transfer among firms (e.g., inputs of an organizational nature) (Pavitt, 2006); examples include routines, problem-solving capacity – competences that enable innovation activity tasks that require collective effort within firms to be performed –, and entrepreneurial capacity – which enables firms to address opportunities and requirements of their innovative environment (Teece, 2010).

Innovation Networks. Collaborative innovation networks and transfers of innovation-related knowledge between individual innovation actors are the subject of inquiry in ‘Innovation Networks’. The central research questions are: ‘what motivates individual innovation actors to contribute differential resources and know-how to achieve complementary aims?’, and ‘how are these networks composed of individual innovation actors?’ (Powell and Giannella, 2010).

Evaluation/Performance of Firms. Studies in ‘Evaluation/Performance of Firms’ deal with the dynamic in time and space of innovation activity, shaped by differences across firms, sectors, and industries. These studies generally encompass the analysis of different quantitative variables characterizing firms (e.g., age, growth rate, and size) and industries (e.g., entry/exit, number of patents, and R&D) over time (Cohen, 2010).

² For a representation of the relationship between chapters/papers and the topics classified in this section, see Appendix, Table A1.

Geography of Innovation. Several factors (e.g., spillovers of knowledge and technology, and types of knowledge) are partially (positively) correlated with the success of innovation activity through geographic characteristics (in essence, spatial concentration and proximity) (Feldman and Kogler, 2010). The mechanisms through which these correlations contribute to the success of innovation activity are at the origin of research in ‘Geography of Innovation’. Examples of mechanisms that have drawn special attention are spinoff dynamics and agglomeration economies (Boschma and Wenting, 2007).

Intellectual Property Rights. This topic classifies studies on intellectual property rights (e.g., patents, copyrights, and trademarks). These studies essentially focus on the relationships between intellectual property rights and incentives to innovate, competition policy, and distortion, redirection or blocking of technological progress (Rockett, 2010).

Science-Firm Interaction. The ‘Science-Firm Interaction’ classification includes studies on relationships in public-private innovation networks. Such relationships usually take place between universities, public laboratories and private users of research; they are sometimes voluntary (e.g., a private firm can recognize a practical application for an academic discovery and can collaborate in order to exploit it), and sometimes managed (e.g., by direct industrial funding of university research) (Foray and Lissoni, 2010).

Innovation in Services. Some services (e.g., software, and telecommunications) have been important triggers to innovation across the economy as agents of transfer, innovation support, and sources of innovations for other sectors (Miles, 2006; Gallouj and Savona, 2009). All the studies that focus on service innovations are included in this topic.

Innovation and Diffusion. ‘Innovation and Diffusion’ studies focus on the spreading/adoption process of new innovations. The introduction of new innovations (e.g., new products, processes, and practices) is a central aspect connecting innovation activity as well as social and economic change (Stoneman and Battisti, 2010).

Systems of Innovation. Research in ‘Systems of Innovation’ analyzes innovation activity from a systemic view. The ‘system of innovation’ concept describes the elements, relationships, and systemic characteristics that comprise innovation as an activity (Soete et al., 2010). The analysis framework for a System of Innovation is commonly characterized in terms of activities (Technological Innovation Systems – Carlsson and Stankiewicz, 1991; Complex Products and Systems – Hobday et al., 2000), sectors (Sectoral Innovation Systems – Breschi and Malerba, 2000), and geography (National Innovation Systems – Lundvall, 1992; Nelson, 1993; Regional Innovation Systems – Cooke et al., 1997).

Science, Technology and Innovation Policies. This topic includes studies on three main classes of policies related to innovation activity from a national perspective: ‘Science’, ‘Technology’, and ‘Innovation’ policies.³ The role of policy in innovation activity at the national level basically has to do with the promotion of appropriate general education, entrepreneurship, positive attitude towards science and technology, and intellectual property rights (Lundvall and Borrás, 2006).

Development and Growth. Studies on innovation-driven economic development and growth at the country level are classified in ‘Development and Growth’. As surveyed in Fagerberg et al. (2010), these studies range from technical change, clusters of technical innovations, ‘catching-up’, to other issues relating economic development and growth with innovation activity.

Globalization of Innovation. ‘Globalization of Innovation’ classifies studies on international innovative efforts. Examples include cross-patenting, licensing activities, and technological collaboration, and effects across countries (Keller, 2010). A major driving force behind the ‘globalization’ of innovation activity are multinational enterprises (Narula and Zanfei, 2006).

Measurement of Innovation. Measuring innovation performance is the main focus in this topic. Innovation performance is not directly measurable; it has to be inferred from the success and failure of innovation activity. R&D is often used as a proxy, especially in microeconomic studies or in cross-country studies (Stoneman and Battisti, 2010). Recently, such studies have increasingly focused on patents statistics (Nagaoka et al., 2010) and innovation survey data (Mairesse and Mohnen, 2010).

Conceptual/Economic Thought. This topic includes studies that critically examine current conceptions and approaches within the innovation area, or promote researchers’ ability to evaluate and integrate competing approaches.

3. Assessing the literature on the economics of innovation: methodological considerations

3.1. The selection of ICC

The handbooks surveyed include 1336 different citations of articles published in refereed journals.⁴ These articles represent publications in 269 different journals. Table 1 lists 16 of these journals ranked by the number of articles contributing to the handbooks’ citations. Only

³ For an overview of these policies, see Lundvall and Borrás (2006).

⁴ This and the remaining results in this subsection were obtained by manual processing all the relevant references included in the four handbooks surveyed. It enabled a rigorous account of all the different references, since all their elements (e.g., names of authors, and journal titles) were carefully checked. Information as to whether each journal was refereed was collected from the journal’s respective website.

the journals that contributed with at least 19 articles (1%) are listed, having published jointly 46% of the 1336 articles. It is thus clear that the majority of these articles involve relatively few journals. More relevant is the fact that, since the early 1990s, more specifically since the foundation of ICC in 1992, 266 of the 269 journals published no more than 3% of all articles cited, with only 3 publishing more than 5% of the total articles cited: *Research Policy* (16%), ICC (7%), and *Strategic Management Journal* (6%).

Table 1: Distribution of refereed journal articles cited in major handbooks on innovation

Journal	Number of articles			Relative number of articles		
	<1978	1978-1991	1992-2005	<1978	1978-1991	1992-2005
RP	6	56	77	0.02	0.09	0.16
AER	25	29	11	0.10	0.05	0.02
EJ	29	20	6	0.11	0.03	0.01
QJE	21	9	15	0.08	0.02	0.03
ICC	-	-	32	-	-	0.07
SMJ	0	3	29	0.00	0.01	0.06
ASQ	3	13	13	0.01	0.02	0.03
JPE	14	12	2	0.05	0.02	0.00
TFSC	3	23	1	0.01	0.04	0.00
HBR	10	11	6	0.04	0.02	0.01
JEBO	0	19	6	0.00	0.03	0.01
JIE	6	14	5	0.02	0.02	0.01
RES	14	5	2	0.05	0.01	0.00
FT	0	15	5	0.00	0.03	0.01
EC	11	7	1	0.04	0.01	0.00
JEL	3	9	7	0.01	0.02	0.01
Other	112	349	267	0.44	0.59	0.55
Total	257	594	485	1.00	1.00	1.00

Note: Major handbooks considered: Dosi et al. (eds.) (1988), Freeman (ed.) (1990), Dodgson and Rothwell (eds.) (1994) and Fagerberg et al. (eds.) (2006).

Abbreviations: RP–Research Policy; AER–American Economic Review; EJ–Economic Journal; QJE–Quarterly Journal of Economics; ICC–Industrial and Corporate Change; SMJ–Strategic Management Journal; ASQ–Administrative Science Quarterly; JPE–Journal of Political Economy; TFSC–Technological Forecasting and Social Change; HBR–Harvard Business Review; JEBO–Journal of Economics and Behaviour Organization.

Based on an analysis of the aims and scope of these three journals (see Appendix, Table A2), it was possible to conclude that the *Research Policy* (RP hereafter) and ICC journals come closest to covering all the topics identified in the field of economics of innovation (cf. Section 2). Central elements in the programmatic presentations of both RP and ICC are innovation and structural change viewed in their wider context (e.g., geographic, historical, institutional, social, and technological). However, RP follows a more managerial and policy-oriented

approach, whereas ICC stands squarely at the core of the economics area.⁵ For this reason, we selected ICC for an in-depth analysis of the evolution of the main topics and types of research associated with the journal literature in the field of economics of innovation.

3.2. The bibliometric analysis

We reviewed all articles published in ICC from January 1992 (Vol. 1, Issue 1) to August 2009 (Vol. 18, Issue 4) in order to classify both their research topic and type of research conducted. Excluding editorial remarks and ‘errata’ publications, 545 articles were published in total.

Each of these 545 articles was classified into one of the fourteen research topics defined in Section 2: (1) ‘Innovation in Firms’, (2) ‘Innovation Networks’, (3) ‘Evaluation/Performance of Firms’, (4) ‘Geography of Innovation’, (5) ‘Intellectual Property Rights’, (6) ‘Science-Firm Interaction’, (7) ‘Innovation in Services’, (8) ‘Innovation and Diffusion’, (9) ‘Systems of Innovation’, (10) ‘Science, Technology and Innovation Policies’, (11) ‘Development and Growth’, (12) ‘Globalization of Innovation’, (13) ‘Measurement of Innovation’, and (14) ‘Conceptual/Economic Thought’.

Each article was also classified into one of the five types of research as defined in Silva and Teixeira (2009): ‘Formal’, ‘Appreciative’, ‘Empirical’, ‘Formal plus Empirical’, and ‘Appreciative plus Empirical’. The articles categorized in ‘Formal’ usually develop mathematical models or are based on an analytical or logical framework. The ‘Appreciative’ classification includes articles in the form of discussion, theoretical argument, review, or survey. ‘Empirical’ studies are concerned with the econometric or statistical testing of data. When ‘Formal’ articles include testing of data, they were classified as ‘Formal and Empirical’. Articles dealing with appreciations or comments on empirical data analysis were classified in ‘Appreciative and Empirical’.

4. Recent trends in the economics of innovation literature: evidence from ICC, 1992-2009

4.1. By research topic

Of the 545 articles collected from ICC, 522 fell in the field of economics of innovation.⁶ Figure 1 illustrates the classification of these 522 articles by research topic and time period.

⁵ To be clearer in this respect, see the RP’s editorial in its first issue. It firmly states that it intends to cover both industrial R&D policies and government policies to bridging the gap between academic research and its policy application. This may be a reason why it was one of the journals leading the citations. Notwithstanding, RP was founded much earlier (1971).

⁶ After having reviewed the 545 articles collected from ICC, we considered that 23 articles (3.8%) fall outside the field of economics of innovation. These 23 articles do not include clear references of an economic nature associated with innovation as an activity, and fall in areas such as Sociology of Organizations, Organization Theory, and Social Psychology.

In the 1992-2009 period, ‘Innovation in Firms’ (24.3%) and ‘Systems of Innovation’ (13.2%) were the two most focused research topics, followed by ‘Evaluation/Performance of Firms’ (9.2%), ‘Innovation Networks’ (8.6%), ‘Conceptual/Economic Thought’ (8.4%) and ‘Science, Technology and Innovation Policies’ (8.0%), whereas ‘Globalization of Innovation’, ‘Measurement of Innovation’, ‘Development and Growth’, ‘Geography of Innovation’, ‘Innovation and Diffusion’, ‘Intellectual Property Rights’, ‘Science-Firm Interaction’ and ‘Innovation in Services’, individually accounted for just 3-4% (15-20 articles) of the total articles in the field.

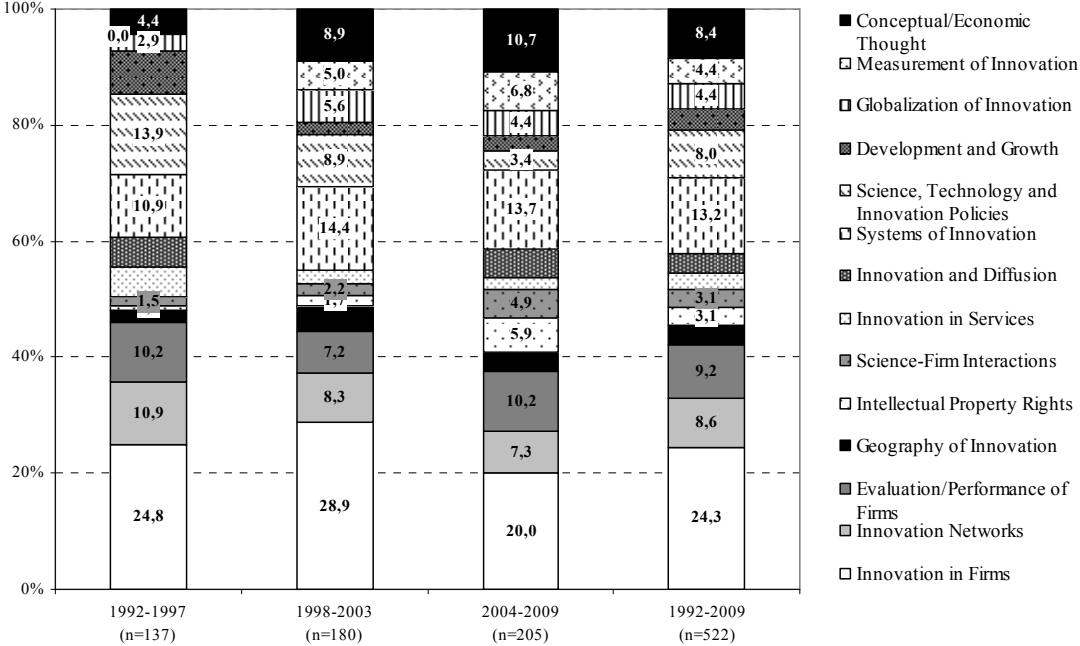


Figure 1: Distribution of articles published in ICC by research topic and time period.

Source: Authors’ own computations based on a review of 522 articles, 1992-2009.

The study of innovation activity has traditionally focused on at the firm level (Fagerberg, 2006), as exemplified by the weight of the ‘Innovation in Firms’ topic in the earlier periods. The ‘Systems of Innovation’ literature has emerged recently, and became very popular among researchers and policy makers (Sharif, 2006; Teixeira, 2008). Researchers have developed a variety of conceptual approaches to studying innovation activity under a systems perspective. From the point of view of policy, the systems perspective has highlighted the importance of public institutions as coordination agents (Soete et al., 2010).

The clearest research trends were found in the rise of ‘Conceptual/Economic Thought’ (4.4 to 8.9 to 10.7%), ‘Measurement of Innovation’ (0.0 to 5.0 to 6.8%), ‘Intellectual Property Rights’ (0.7 to 1.7 to 5.9%) and ‘Science-Firm Interaction’ (1.5 to 2.2 to 4.9%), and the decline of ‘Innovation Networks’ (10.9 to 8.3 to 7.3%), ‘Science, Technology and Innovation Policies’ (13.9 to 8.9 to 3.4%) and ‘Innovation in Services’ (5.1 to 2.2 to 2.0%). The

increasing relevance of ‘Science-Firm Interaction’ and the decrease of ‘Innovation Networks’ and ‘Innovation in Services’ can be considered the least pronounced trends, with a frequency variation between the first and last periods of analysis of around 3 percentage points (15 articles). The increasing trend of ‘Conceptual/Economic Thought’, ‘Measurement of Innovation’ and ‘Intellectual Property Rights’, and the decreasing trend of ‘Science, Technology and Innovation Policies’, were relatively more pronounced, registering a frequency variation of at least 5 percentage points (26 articles).

Innovation as an activity has been studied by various communities of researchers with different backgrounds, and communication failures among them have caused a lack of clarity with respect to basic concepts (Fagerberg, 2006). In the field of economics of innovation, the rise of ‘Conceptual/Economic Thought’ can be seen as a trend towards bringing these different communities together in dialogue.

‘Science’ policy, ‘Technology’ and ‘Innovation’ policies represent a shift in focus towards a more instrumental approach, where the main objectives are economic growth and international competitiveness (Lundvall and Borrás, 2006). The fostering of ‘public-private interaction’ and the regulation of ‘intellectual property rights’ can be found among the instruments to be used. Broadly speaking, therefore, the decreasing trend of ‘Science, Technology and Innovation Policies’, on the one hand, and the increasing trend of ‘Science-Firm Interaction’ and ‘Intellectual Property Rights’, on the other hand, can be perceived as mutually exclusive.

Until recently, ‘Science-Firm Interaction’ and ‘Intellectual Property Rights’ did not occupy a central place in debates on international competitiveness and economic policy. With regard to ‘Science-Firm Interaction’, research on the role of universities in industrial innovation has increased rapidly, largely motivated by the National Systems of Innovation literature (Mowery and Sampat, 2006). This literature has conceptualized universities as an important institutional actor at the country level. The study of ‘Intellectual Property Rights’ has grown in relevance with the advent of knowledge-intensive economies, as intellectual property has become one of the most valuable, strategic economic commodities (Granstrand, 2006). The patent system, in particular, has received growing attention (although with varying intensity) (Almeida et al., 2010; Rockett, 2010).

The ‘Measurement of Innovation’ has received considerable attention due to the growing number of different international comparison methods of innovation performance across countries (Hall et al., 2010; Mairesse and Mohnen, 2010; Nagaoka et al., 2010). There is in

particular a growing controversy regarding the reliability of indicator-based comparisons of international innovation performance and challenges associated with their use for national policy purposes (Freeman and Soete, 2009). The criticism is generally related to the ways data and methodologies are used in the construction of innovation indicators (Grupp and Schubert, 2010).

4.2. By type of research

Over the three periods of analysis (cf. Figure 2), articles classified in ‘Appreciative’ (37.2%) were the most frequent, followed by ‘Empirical’ (29.1%), ‘Appreciative plus Empirical’ (15.7%), ‘Formal’ (9.4%), and ‘Formal plus Empirical’ (8.6%).

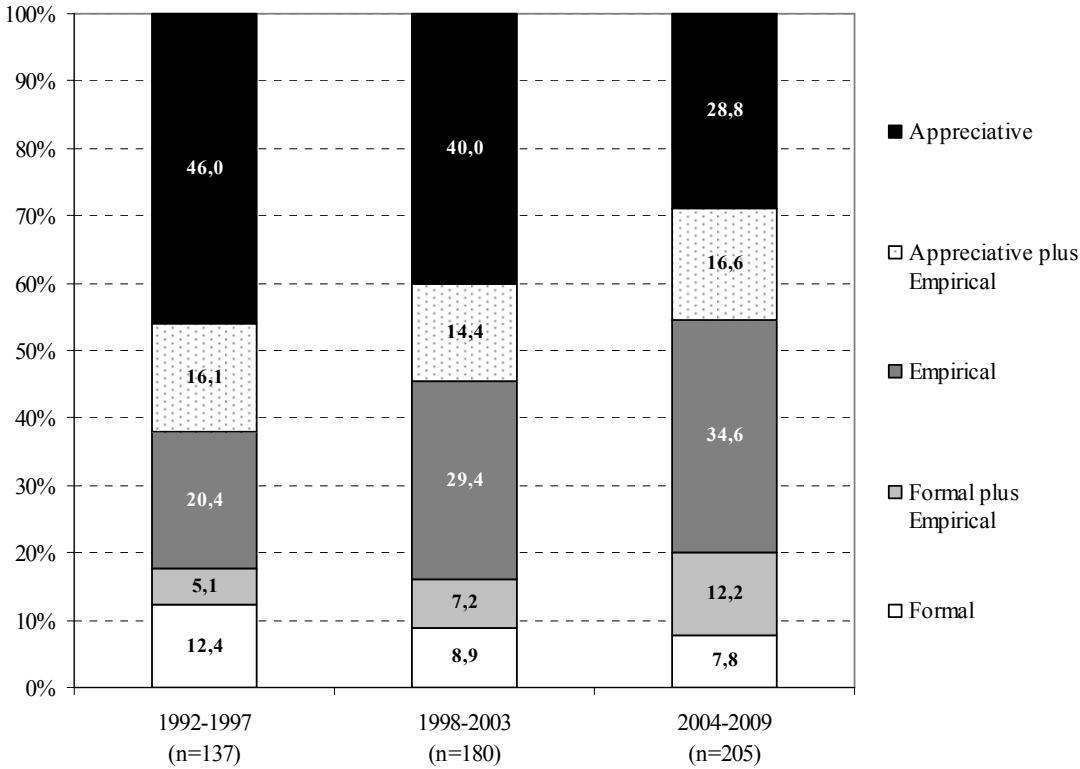


Figure 2: Distribution of articles published in ICC by type of research and time period.
Source: Authors’ own computations based on a review of 522 articles, 1992-2009.

Among the clearest trends by type of research, the decline of ‘Appreciative’ (46 to 40 to 28.8%) and the rise of ‘Empirical’ (20.4 to 29.4 to 34.6%) were the most pronounced trends, while ‘Formal’ (12.4 to 8.9 to 7.8%) and ‘Formal plus Empirical’ (5.1 to 7.2 to 12.2%) followed relatively less pronounced trends. ‘Appreciative plus Empirical’ (16.1 to 14.4 to 16.6%) did not display a clear trend.

In contrast to the economics area in general (Silva, 2000) and some specific scientific areas, namely the evolutionary (Silva and Teixeira, 2009) and structural change (Silva and Teixeira,

2008), there is no marked tendency towards predominantly ‘Formal’ studies. Indeed, on the whole, ‘Formal’ and ‘Formal plus Empirical’ evolved from 17.5 to 16.1 to 20.0%.

The mixed empirically-related studies (which aggregates ‘Appreciative plus Empirical’ and ‘Formal plus Empirical’ studies) increased 7.2 percentage points (37 articles) in the third period of analysis in relation to the second. Arguably, this finding indicates that theoretical knowledge in the field has gained strength in relation to its analytical and predictive faculties. Such studies are more likely to be replicated over new evidence, and thereby provide analytical tools, for instance, for drafting decisions or policies. They can thus constitute a test for existing theories, which may increase their predictive success or corroboration.

Conversely, insights from purely empirical studies (‘Empirical’) are limited in that regard. By establishing observational facts, ‘Empirical’ studies are important in constraining theorizing, because they may be important in deriving answers to questions relevant to decision-makers and researchers, or because they may be important in establishing stylized facts. However, on their own, observational facts are of limited use in analytical and predictive terms. If we take analytical and predictive faculties as important goals of theory developments in the field, then the finding that exclusively ‘Empirical’ studies have increased fairly sharply (from 20.4 to 29.4 to 34.6%) indicates that the connection between the body of analytical and predictive theory and empirics is (increasingly) lacking.

5. Conclusions

Two main findings emerge from the present study. First, the topics ‘Intellectual Property Rights’, ‘Measurement of Innovation’ and ‘Conceptual/Economic Thought’, revealed the most pronounced, and increasing, research trends. And second, ‘Empirical’ is the relatively more frequent type of research.

‘Intellectual Property Rights’ (Rockett, 2010) and ‘Measurement of Innovation’ (Hall et al., 2010; Mairesse and Mohnen, 2010; Nagaoka et al., 2010) are far from settled literatures. There are many research opportunities under these topics both in terms of empirics and the development of theoretical models or conceptual tools, where their attributes should be analytically useful. In general terms, ‘Conceptual/Economic Thought’ reflects the increasing complexity of the field (Antonelli, 2009).

So far, some problems in economics of innovation have not lent themselves to rigorous mathematical treatment (e.g., entrepreneurship, and systems of innovation), and may never come to do so. It is clear that formalism, particularly mathematical formalism, brings clarity

and rigour to arguments. But if we are to advance knowledge in such problems, we may have to settle for looser types of research than that afforded by mathematical modelling, as suggested by the relative increase of ‘Empirical’.

It can be said that the goal of theorizing in the economics of innovation is primarily to provide an ‘economics’ understanding of what is going on in innovation activity. To a large extent, this view makes theoretical progress in the field contingent on the relationship of economic theory to empirical evidence on innovation activity. That is, the existence of theoretical progress is dependent on a stock of empirical evidence that can guide and constrain economic theorizing. Theoretical progress thus requires that more and improved ‘Empirical’ studies.

However, theoretical progress in terms of analytical and predictive efficacy tends to depend on straightforward theoretical interpretation of empirical findings, and on testing them in light of the existing theoretical framework. In an effort to enhance the connection between the body of analytical and predictive theory and empirics in the field, the main implication of the finding that, in relative terms, ‘Empirical’ studies have increased is that there may be a need to consider more testing of theory and the use of theory in guiding empirical studies.

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Appendix

Table A1: Categorizing the main themes in the economics of innovation field based on a review of Dosi et al. (eds.) (1988), Freeman (ed.) (1990), Dodgson and Rothwell (eds.) (1994) and Fagerberg et al. (eds.) (2006)

Main theme	Handbook	Chapter/Paper
	Dosi et al. (eds.) (1988)	Technological Change and the Nature of the Firm
		The Nature of the Innovative Process
	Dodgson and Rothwell (eds.) (1994)	The R and D Function: corporate strategy and structure
		Towards the Economics of Information-Intensive Production Systems
	Freeman (ed.) (1990)	Implementation of Manufacturing Innovations
		Industrial Innovation: success, strategy, trends
	Freeman (ed.) (1990)	Innovation and Consumer Electrics
		Innovation and Manufacturing Strategy
	Freeman (ed.) (1990)	Innovation and Size of Firm
		Innovation and Organization
	Freeman (ed.) (1990)	Innovation and Training
		Innovation in East Asia: diversity and development
	Freeman (ed.) (1990)	Key Characteristics of Large Innovating Firms
		Managing Innovation in Multi-Technology Corporations
	Freeman (ed.) (1990)	Marketing and Innovation
		Supplier Relationships and Innovation
	Freeman (ed.) (1990)	Technology and Business Strategy
		User/Supplier Links and Innovation
'Innovation in Firms'	Freeman (ed.) (1990)	B. Gold (1980) 'On the Adoption of Technological Innovations in Industry: Superficial Models and Complex Decision Processes,' <i>Omega</i> , 8
		D. Mowery (1983) 'The Relationship between Intrafirm and Contractual Forms of Industrial Research in American Manufacturing, 1900-1940,' <i>Explorations in Economic History</i> , 20
	Freeman (ed.) (1990)	D. Teece (1986) 'Profiting from Technological Innovation: Implications for Integration, Collaboration, Licensing and Public Policy,' <i>Research Policy</i> , 15
		Von Hippel (1982) 'Appropriability of Innovation Benefit as a Predictor of the Source of Innovation,' <i>Research Policy</i> , 11
	Freeman (ed.) (1990)	G. Dosi (1988) 'Sources, Procedures, and Microeconomic Effects of Innovation,' <i>Journal of Economic Literature</i> , XXVI
		M.A. Maidique and B.J. Zirger (1985) 'The New Product Learning Cycle,' <i>Research Policy</i> , 14
	Freeman (ed.) (1990)	R. Rothwell and P. Gardiner (1988) 'Re-Innovation and Robust Designs: Producer and User Benefits,' <i>Journal of Marketing Management</i> , 3
	Fagerberg et al. (eds.) (2006)	Innovation Processes
		Organizational Innovation
		The Innovative Firm

(continued)

Table A1: (continued)

Main theme	Handbook	Chapter/Paper
'Innovation Networks'	Dosi et al. (eds.) (1988)	Technological Change and the Nature of the Firm
	Dodgson and Rothwell (eds.) (1994)	A Regional Perspective on Innovation
		Basic Research and Industrial Innovation
		Clusters, Chains and Complexes
Freeman (ed.) (1990)	Innovation and Industrial Relations	
	Innovation in Semiconductor Technology	
	Technological Collaboration and Innovation	
	D. Mowery (1983) 'The Relationship between Intrafirm and Contractual Forms of Industrial Research in American Manufacturing, 1900-1940,' <i>Explorations in Economic History</i> , 20	
Freeman (ed.) (1990)	D. Teece (1986) 'Profiting from Technological Innovation: Implications for Integration, Collaboration, Licensing and Public Policy,' <i>Research Policy</i> , 15	
	F. Kodama (1986) 'Japanese Innovation in Mechatronics Technology,' <i>Science and Public Policy</i> , 13	
	G. Dosi (1988) 'Sources, Procedures, and Microeconomic Effects of Innovation,' <i>Journal of Economic Literature</i> , XXVI	
Fagerberg et al. (eds.) (2006)	Networks of Innovators	
	Regional Innovation Systems	
	Sectoral Systems of Innovation	
	The Role of Multinational Enterprises	
'Evaluation/Performance of Firms'	Dosi et al. (eds.) (1988)	Towards the Economics of Information-Intensive Production Systems
	Dodgson and Rothwell (eds.) (1994)	Innovation and Size of Firm
		D. Teece (1986) 'Profiting from Technological Innovation: Implications for Integration, Collaboration, Licensing and Public Policy,' <i>Research Policy</i> , 15
		G. Dosi (1988) 'Sources, Procedures, and Microeconomic Effects of Innovation,' <i>Journal of Economic Literature</i> , XXVI
	Freeman (ed.) (1990)	R. Kaplinsky (1983) 'Firm Size and Technical Change in a Dynamic Context,' <i>The Journal of Industrial Economics</i> , XXXII
		L.L.G. Soete (1979) 'Firm Size and Inventive Activity: The Evidence Reconsidered,' <i>European Economic Review</i> , 12
		D. Sahal (1985) 'Technological Guideposts and Innovation Avenues,' <i>Research Policy</i> , 14
		J. Utterback and W. Abernathy (1975) 'A Dynamic Model of Process and Product Innov.,' <i>Omega</i> , 3
	Fagerberg et al. (eds.) (2006)	Innovation and Competitiveness
		Innovation in 'Low-Tech' Industries
Innovation through time		
Sectoral Systems		

(continued)

Table A1: (continued)

Main theme	Handbook	Chapter/Paper
'Geography of Innovation'	Dodgson and Rothwell (eds.) (1994)	A Regional Perspective on Innovation
	Fagerberg et al. (eds.) (2006)	Regional Innovation Systems Systems of Innovation
'Intellectual Property Rights'	Dosi et al. (eds.) (1988)	Institutions Supporting Technical Change in the US Technical Change in LDCS Technological Change and the Nature of the Firm
	Freeman (ed.) (1990)	D. Teece (1986) 'Profiting from Technological Innovation: Implications for Integration, Collaboration, Licensing and Public Policy,' <i>Research Policy</i> , 15 E. Mansfield (1985) 'How Rapidly does New Industrial Technology Leak Out?,' <i>The Journal of Industrial Economics</i> , XXXIV
	Dodgson and Rothwell (eds.) (1994)	Innovation and Intellectual Property
	Fagerberg et al. (eds.) (2006)	Innovation and Intellectual Property Rights
	Dosi et al. (eds.) (1988)	Institutions Supporting Technical Change in the US Technical Change and the Nature of the Firm
'Public-Private Interaction'	Fagerberg et al. (eds.) (2006)	Innovation Processes Universities in National Innovation Systems
	Dodgson and Rothwell (eds.) (1994)	Innovation in Services Innovation in Telecommunication
'Innovation in Services'	Fagerberg et al. (eds.) (2006)	Innovation in Services
	Dosi et al. (eds.) (1988)	The Diffusion of Innovations
'Innovation and Diffusion'	Freeman (ed.) (1990)	B. Gold (1980) 'On the Adoption of Technological Innovations in Industry: Superficial Models and Complex Decision Processes,' <i>Omega</i> , 8 E. Mansfield (1985) 'How Rapidly does New Industrial Technology Leak Out?,' <i>The Journal of Industrial Economics</i> , XXXIV G. Silverberg et al. (1988) 'Innovation, Diversity and Diffusion: A Self Organization Model,' <i>Economic Journal</i> J.S. Metcalfe (1981) 'Impulse and Diffusion in the Study of Technical Change,' <i>Futures</i> , 13 P.A. David (1985) 'Clio and the Economics of QWERTY,' <i>American Economic Review</i> , 75
	Dodgson and Rothwell (eds.) (1994)	Diffusion of Innovation Ancient and Modern Implementation of Manufacturing Innovations
	Fagerberg et al. (eds.) (2006)	Innovation and Diffusion

(continued)

Table A1: (continued)

Main theme	Handbook	Chapter/Paper	
'Systems of Innovation'	Dosi et al. (eds.) (1988)	Can the Innovation System of Capitalism be Outperformed?	
		Innovation as an Interactive Process	
		Institutions Supporting Technical Change in the US	
		Japan: A New National System of Innovation?	
	Dodgson and Rothwell (eds.) (1994)	Technological Opportunities and Industrial Organization	
		A Regional Perspective on Innovation	
		Financial Systems and Innovation	
		Innovation in Construction Sector	
		Innovation in East Asia	
		Innovation in Energy Supply	
Innovation in Semiconductor Technology			
Innovation in Telecommunication			
Fagerberg et al. (eds.) (2006)	Innovation in the Chemicals Industry		
	Military Technology		
	The Case of Automobiles		
	The Japanese Innovation System		
'Science, Technology and Innovation Policies'	Dosi et al. (eds.) (1988)	Finance and Innovation	
		Regional Innovation Systems	
	Freeman (ed.) (1990)	Sectoral Systems	
		Systems of Innovation	
	Dodgson and Rothwell (eds.) (1994)	Policy Conclusions	
		D. Teece (1986) 'Profiting from Technological Innovation: Implications for Integration, Collaboration, Licensing and Public Policy,' <i>Research Policy</i> , 15	
		Technological Systems and Economic Performance	
	'Development and Growth'	Dosi et al. (eds.) (1988)	Science, Technology and Innovation Policy
			Catching-up in Technology
		Freeman (ed.) (1990)	Why Growth Rates Differ
C. Freeman (1984), 'Prometheus Unbound,' <i>Futures</i> , 16			
C. Perez (1985) 'Microelectronics, Long Waves and World Structural Change: New perspectives for Developing Countries,' <i>World Development</i> , 13			
J. Fagerberg (1987) 'A Technology Gap Approach to Why Growth Rates Differ,' <i>Research Policy</i> , 16			
Dodgson and Rothwell (eds.) (1994)		R. Nelson and S. Winter (1974) 'Neoclassical vs Evolutionary Theories of Economic Growth: Critique and Prospectus,' <i>Economic Journal</i>	
		Innovation and Growth	
		Technological Systems and Economic Performance	
Fagerberg et al. (eds.) (2006)		Innovation and Catching-up	
	Innovation and Economic Growth		
		Innovation and Employment	

(continued)

Table A1: (continued)

Main theme	Handbook	Chapter/Paper
'Globalization of Innovation'	Dosi et al. (eds.) (1988)	Technical Change and International Trade
		Technical Change in LDCS Multinational Enterprises and the International Diffusion of Technology
	Fagerberg et al. (eds.)	The Role of Multinational Enterprises
'Measurement of Innovation'	Dosi et al. (eds.) (1988)	Formalizing Growth Regimes
		Modelling Economic Dynamics and Technical Change On the Dynamics of Aggregate Macroequations Structural Crises of Adjustment
	Freeman (ed.) (1990)	E. Mansfield et al. (1981) 'Imitation Costs and Patents: An Empirical Study,' <i>The Economic Journal</i> , 91
		G. Dosi (1988) 'Sources, Procedures, and Microeconomic Effects of Innovation,' <i>Journal of Economic Literature</i> , XXVI
		J. Utterback and W. Abernathy (1975) 'A Dynamic Model of Process and Product Innov.,' <i>Omega</i> , 3
	K. Pavitt (1984) 'Sectoral Patterns of Technical Change: Towards a Taxonomy and a Theory,' <i>Research Policy</i> , 13	
	M.A. Maidique and B.J. Zirger (1985) 'The New Product Learning Cycle,' <i>Research Policy</i> , 14	
	Fagerberg et al. (eds.) (2006)	Measuring Innovation Innovation in 'Low-Tech' Industries
'Conceptual/Economic Thought'	Dosi et al. (eds.) (1988)	Competing Technologies
		Coordination and Order in Economic Change and the Interpretative Power of Economic Theory
		Coordination and Transformation
		Evolution, Innovation and Economics
		Evolutionary Theories in Economic Thought
	Imperfect Decisions and Routinized Production	
	Technical Change and the Theory of 'régulation'	
	Freeman (ed.) (1990)	J.E. Elliott (1980) 'Marx and Schumpeter on Capitalism's Creative Destruction: A Comparative Restatement,' <i>Quarterly Journal of Economics</i>
N. Rosenberg (1976) 'On Technological Expectations,' <i>The Economic Journal</i> , 86		
S. Winter (1986) 'Comments on Arrow and on Lucas,' <i>Journal of Business</i> , 59		
		W.B. Arthur (1989) 'Competing Technologies, Increasing Returns and Lock-In by Historical Events,' <i>Economic Journal</i> , 99
	Dodgson and Rothwell (eds.) (1994)	Environmental Issues and Innovation The Global Innovatory Challenge Across the 21 st cent.

Table A2: Research Policy, Industrial and Corporate Change, and Strategic Management Journal: Aims and scope

Journal	Aims and scope
Research Policy	<p>Research and development (R&D) and innovation today absorb very considerable resources. These activities have great influence on the policies of industrial firms, government departments, universities and nations. Research Policy is a multi-disciplinary journal devoted to the policy and management problems posed by innovation, R&D, technology and science, and related activities concerned with the acquisition of knowledge (learning) and its exploitation. Its papers examine the interaction between these activities and economic, social, political and institutional processes. Many of the papers are empirically focused but others are more theoretical. They are written by both academic analysts and practitioners of R&D and innovation processes. The journal is international in scope and reaches an audience of academics, industrialists, government officials and others interested in these issues. Its leading academic status and influence are reflected in a high 'impact factor' for a social science journal.</p> <p>Main subjects covered: Competence/Capability (e.g., core, dynamic); Entrepreneur/ Entrepreneurship; Evolutionary/Schumpeterian Economics; Industrial Clusters; Innovation Management/Policy/ Strategy; Knowledge (creation, transfer, exploitation etc.); System(s) of Innovation (national, regional, sectoral etc.); Learning (e.g., organisational) and Experimentation; Problem-solving; Product and Process Development; R&D Management; Research and Development (R&D); Research Policy; Science Policy; and Technology Management/Policy/ Strategy.</p>
Industrial and Corporate Change	<p>The journal is committed to present and interpret the evidence on corporate and industrial change, drawing from an interdisciplinary set of approaches and theories from e.g., economics, sociology of organization, organization theory, political science, and social psychology. It is a forum where industrial historians explicitly relate their analyzes to the state of the art in the relevant social sciences and propose conjectures and theories. Conversely, economists and practitioners of other social disciplines are encouraged to apply their models to the historical evidence.</p> <p>The journal covers the following: the internal structures of firms; the history of technologies; the evolution of industries; the nature of competition; the decision rules and strategies; the relationship between firms' characteristics and the institutional environment; the sociology of management and of the workforce; the performance of industries over time; the labour process and the organization of production; the relationship between, and boundaries of, organizations and markets; the nature of the learning process underlying technological and organizational change.</p>
Strategic Management Journal	<p>The journal publishes original material concerned with all aspects of strategic management. It is devoted to the improvement and further development of the theory and practice of strategic management and it is designed to appeal to both practising managers and academics. (...)</p> <p>Overall, SMJ provides a communication forum for advancing strategic management theory and practice. Such major topics as strategic resource allocation; organization structure; leadership; entrepreneurship and organizational purpose; methods and techniques for evaluating and understanding competitive, technological, social, and political environments; planning processes; and strategic decision processes are included in the journal.</p>

Source: Journals' respective web site.

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