

Book Review On  
Patents, Citations & Innovations  
*A Window on the Knowledge Economy*  
Adam B. Jaffe and Manuel Trajtenberg, Authors

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Book Title :	Patents, Citations & Innovations - A Window on the Knowledge Economy
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The 2 authors Jaffe and Trajtenberg are international scholars who have collaborated and published extensively on the application of patent citations as a systematic measure of innovation and technical change. This book is a compilation of 10 papers on this subject published in the span between 1990 and 2002 by the authors and 5 other collaborators namely, Rebecca Henderson, Ricardo J. Caballero, Michael S. Fogarty, Bruce A. Banks, and Josh Lerner. In this volume, the authors investigated the broad application of patent citations as a proxy for innovation in an attempt to provide an empirical foundation to the theories of technical change as the driver of economic growth. Towards this end, the authors have systematically examined the U.S. Patent and Trademark Office (USPTO) database of exceeding 3 million patents issued between the 1963 and 1999. This unique research had prompted Paul Romer in the preface of the book to remark that the authors have “built a comparable base that a new generation of theorists can use when they are ready to put their models to work.”

This book is divided into an introduction and 10 chapter grouped into 4 parts dealing with topics on Conceptual and Methodological Foundations, The Geography of Knowledge Spillovers, Policy Motivation Evaluation of Institutions and Countries, and The Patents and Citations Data.

In the introductory chapter, the authors explicated their dissatisfaction with the Solow (1956, 1957) growth theory which attributed growth to exogenous technical change while remaining conspicuously silent on empirical measurements of technical change. Here, the authors staked their work as continuation to the philosophical foundation laid by Kuznets (1962), Schmookler (1966) and Griliches (1984). Kuznets highlighted the difficulty of measuring the results of the inventive process and suggested the use of the rich information available in patent records to study this process. Schmookler was the first to demonstrate the use of patents as a proxy in measuring innovation. Finally, Griliches suggested the use of the patent citations to investigate the flow of technical knowledge between inventors.

Part 1 - *Conceptual and Methodological Foundations* – explained the basic presumption of the authors’ research in that a patent citation indicates a technical relationship between the citing and cited patents. Chapter 2 examined the usefulness of patent indicators by making example of innovations related to CT scanners. This resulted in the development of a patents citation index which was found to be highly correlated to independent measures of social gains from innovations. Chapter 3 dealt with the construction of citation based measures for “basicness” and “appropriability”

which were used to test the hypothesis that university patents are more fundamental than corporate patents. Chapter 4 attempted at modeling the effects of knowledge diffusion and obsolescence using the patent citations index.

Part 2 - *The Geography of Knowledge Spillovers* – was a collection of 3 empirical studies on knowledge spillovers. In Chapter 5, the authors demonstrated the tracing of geographic spillovers through patent citations which evidenced that citations tend to be localized geographically. Chapter 6 attempted to map geographic spillovers with an additional time dimension which indicated that citations also tended to be higher in the early years of the patent. Finally in Chapter 7, an attempt was made to trace international knowledge spillover and it was found that there are significant differences in patterns of spillovers in different countries included in the survey.

Part 3 - *Policy Motivation Evaluation of Institutions and Countries* – looked into the performance of research institutions and countries. Chapter 8 analyzed patenting by universities and discovered that in recent years volume of patents has increased with a small drop in the quality of patents. Chapter 9 uncovered the positive impact of NASA and other agencies on innovation. Chapter 10 investigated the impact of public policy on innovation through the measure of the patent citations index and it was found that recent policy changes has encouraged more patents. Chapter 11 was a study specific to Israel where it was discovered that despite it having a high patents per capita ratio and highly cited patents, it had a very low percentage of assignment to local corporations. I found this to be relevant to my own area of research and interest because Malaysia too had a low percentage of assignment patents to local corporations.

Part 4 - *The Patents and Citations Data* – was all about the USPTO dataset which was compiled by the authors. In Chapter 12, the authors surveyed patentees to understand the modes of knowledge transmission and it was confirmed that patent citations can be used as a proxy for knowledge spillovers between organizations and geographic regions. The final Chapter 13 was an explanation and guide for anyone who intends to use the dataset compiled by the authors for their own research. This dataset can be downloaded from the National Bureau of Economic Research (NBER) website.

In my opinion, this book is a useful compilation of the authors' work on the application of patent citation data in research. It is a helpful reference and companion to a researcher in this subject matter and it facilitates the researcher because the papers are bound in a single volume. There are many ideas which a researcher can pick up for a local research project. However, this book has several shortcomings. The first is that the chapters were not well integrated because similar content such as literature review and the construction of the patents citation index were repeated in almost all the chapters. This disrupted the readability and the sheer enjoyment of reading it. The second issue was with regards to its outdated data because these 10 papers were published over 12 year period. However both these problems can be remedied if the book was rewritten by the authors as a proper book with updated data instead of it being a mere compilation of papers by the authors. Third, the book focused exclusively on patent-to-patent citations which didn't give the reader any alternative measure. It would have enriched the book if the authors could have included other measures of knowledge spillovers such patent to paper as described by Garfield (1979, 1994). Finally, the book didn't have a concluding chapter to

summarize all the findings. Including this chapter along with specific suggestions on public policy would greatly enhance the book's value and fulfill its potential to be the authority on this subject matter.

The value of a book lies in its contribution to the existing corpus of knowledge and I would like to praise the authors for compiling their papers into this book, which I found to be a critical, timely and pertinent contribution. Its foremost contribution would be the original and creative construction of the patent citations index as a proxy to measure innovation and technical change. Therefore, I would recommend this book as an important reference for scholars, policy makers and layman who would be interested in measuring innovation and technical change.

I have read a number of the authors' publications and would not hesitate to testify to the steady progress of the authors' developing a definitive theory in this area. I believe in the authors' potential and hence look forward to their next publication with anticipation and great expectations. I trust many readers would share my sentiments.

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