



The Economics of Innovation

An Introduction



G. M. Peter Swann

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E2009002485

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Published by
Edward Elgar Publishing Limited
The Lypiatts
15 Lansdown Road
Cheltenham
Glos GL50 2JA
UK

Edward Elgar Publishing, Inc.
William Pratt House
9 Dewey Court
Northampton
Massachusetts 01060
USA

A catalogue record for this book
is available from the British Library

Library of Congress Control Number: 2008942911

ISBN 978 1 84844 006 7 (cased)
978 1 84844 027 2 (paperback)

Printed and bound in Great Britain by MPG Books Ltd, Bodmin, Cornwall

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Preface

This book stems from a second year undergraduate course on the *Economics of Innovation* at Nottingham University Business School. That course is an introductory one: all students have studied basic first year micro-economics, but have not studied the economics of innovation *per se*. However, the book is not only aimed at undergraduate students. It is designed for any reader with a basic knowledge of economics who wants to understand the role of innovation in economics.

Innovation is one of the most important economic and business phenomena of our time and is a topic of great practical and policy interest. It is a topic that still receives inadequate attention on most economics and business programmes. It is also a topic that is inadequately understood by economists and most others as well, and yet it has very widespread implications for our economy and society. I hope that those who read this book will learn something about what economics has to say about innovation and what economists can learn by studying innovation.

I wrote the book because none of the existing books on this topic, excellent though they are, could provide the sort of introductory text needed for this sort of course. Amongst these existing books, some of them are too advanced and/or technical for this level, some are too narrow in focus, and some concentrate on a few areas where there is a substantial literature rather than take an overview of the whole topic.

My objective in writing the book was to introduce the student to a broad range of issues around the economics of innovation in no more than 300 pages. Several friends and colleagues kindly provided very useful comments on a first draft. Two common comments were as follows. First, while the book covered many of the main topics, this was often done in a rather superficial way and important areas of the literature on each topic were overlooked. Second, the book contained some rather unexpected topics that my colleagues consider to be outside economics.

Thinking over these comments, and given my self-imposed page limit, it seemed that the only way of dealing with these criticisms would be to write a version with less breadth but more depth. But I was reluctant to go that way for one very important reason. An introduction of this sort should give the student an idea of many of the innovation issues (s)he should have on his/her

‘radar screen’. Some of the students taking this course will not study innovation again, so I wanted to be sure they had some limited grasp of what I consider to be essential themes in the economics of innovation. And even those students destined for further study in the economics of innovation, need a broad introduction at this stage. For the path along which most economics courses tend to evolve is one of constant breadth but ever-greater depth: we look at the same issues, but in ever-greater technical detail. If the student does not get a broad introduction at the start, (s)he will not get it later.

For this reason, the book is unashamedly broad in scope and in places rather shallow. The book contains little technical detail on economic models. My criterion for choosing topics for inclusion is that these should be the most important issues from an empirical point of view, while the extent and sophistication of the literature is not one of my main criteria. At the end of the book, however, there is an appendix listing various supplementary readings to which the student and tutor may want to refer.

The analytical approach taken here is something of a hybrid: some mainstream economics, some evolutionary economics (and other ‘heterodox’ economics), a little history of economic thought and some ideas from adjacent disciplines (such as engineering, psychology and sociology). Why a hybrid approach? Because a hybrid approach is *essential* to understanding the economics of innovation. Pure economics is not enough!

The economics of innovation is one of the liveliest fields of industrial economics, relevant to business and policy, and one where many undergraduate students will find that they already have a lot of useful practical knowledge about innovation gained from everyday life.

Note on Readings and References

At the end of the book, the reader will find an appendix containing a list of suggested supplementary readings. This is followed by a complete list of those references actually cited in the main text. Those tutors and students looking for further material on particular topics will probably find that the first of these (the appendix) is the more useful. In addition, these supplementary readings will guide the students thorough various topics that are not covered in the present book.

Acknowledgements

I have studied the economics of innovation for over thirty years, since the beginning of my PhD. My ideas about the economics of innovation have been guided and influenced by many people, especially the following (but let me stress that none of them has any responsibility for errors or eccentricities in

what follows): Cristiano Antonelli, David Audretsch, Rui Baptista, John Barber, Giuliana Battisti, Catherine Beaudry, Martin Binks, Daniel Birke, Alistair Bruce, Mario Calderini, Hugh Cameron, Bo Carlsson, Martin Cave, Gary Cook, Robin Cowan, Paul David, Giovanni Dosi, Kevin Dowd, Angela Dumas, Peter Earl, Walter Elkan, Dominique Foray, Chris Freeman, Luke Georghiou, Paul Geroski, Yundan Gong, Terence Gorman, Peter Grindley, Jonathan Haskell, Mike Hobday, Robert Hoffman, Tony Horsley, Effie Kesidou, Ray Lambert, Don Lamberton, Wassily Leontief, Franco Malerba, Silvia Massini, Stan Metcalfe, Jonathan Michie, Michio Morishima, Richard Nelson, Ray Oakey, Naresh Pandit, Keith Pavitt, Martha Prevezer, Tudor Rickards, Bob Rothschild, Mark Shurmer, Peter Skott, Luc Soete, Ed Steinmueller, Bob Stone, Paul Stoneman, David Stout, Paul Temple, Bruce Tether, Morris Teubal, Steve Thompson, Nick von Tunzelmann, James Utterback, Tony Watson, Richard Whitley, Paul Windrum and Vasilis Zervos. I am also grateful to Daniel Birke, Effie Kesidou, Cassey Lee Hong Kim, Qing-Ping Ma and Mounia Berrada-Gouzi for pointing out various errors in an earlier draft of the book, and to many students at Nottingham and Manchester Universities for their comments on things that were unclear in earlier versions of specific chapters.

I would like to express special thanks to Edward Elgar Publishing for their interest in my work, to Tim Baker for all his support, and to Jenny, Carri and Emma Swann for their constant encouragement.

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PART I

Context

1. What is the economics of innovation about?

Some of the students approaching this book for the first time may well be thinking: ‘On top of everything else, why do I need to study the economics of innovation?’ Is there anything of particular interest that economists can learn from studying innovation, as opposed to all the other things we study? And is it not enough to learn some general principles of microeconomics which could be applied to issues of innovation as and when we need? Let me address these two points in turn.

I hope to demonstrate in this book that there are indeed many things of huge interest that economists can learn by studying innovation. Without doubt, innovation is one of the most important economic and business phenomena of our time. Innovation has very widespread implications for our economy and society but few of us understand these implications in full. Indeed, because innovation was largely ignored by mainstream economics until about thirty years ago, it is still true that innovation has a more important role within the economy than it does within the discipline of economics. But that is changing and the economics of innovation has become one of the very most popular areas of research for young economists.

I also hope to demonstrate that while the general principles of microeconomics do take us some way in understanding the economics of innovation, they are not sufficient. To develop a real understanding of the economics of innovation and a capacity to explore the many examples of innovation to be found in the real world, the student needs something more than standard microeconomics. (S)he needs at least some appreciation of evolutionary economics (and perhaps some other heterodox approaches to economics). (S)he also needs a little knowledge of the history of economic thought and a little knowledge of some adjacent disciplines (including engineering, psychology and sociology).

In short, therefore, I would say that the reasons to study the economics of innovation, on top of everything else, are that (a) innovation is incredibly important in the real economy and (b) the right way to study the economics of innovation is a bit different from the conventional economists’ training.

THE FIELD

The economics of innovation has been concerned with five main groups of questions. First, how should we categorise and classify the different aspects of innovation? Second, how are innovations created? Third, how do customers react to innovations? Fourth, what effects do innovations have on the broader economy? And fifth, what can and should governments do to support and direct innovation activity? Parts II to VI of this book are organised around these five themes.

Aspects of Innovation

Part II (Chapters 3-8) will set out some of the key concepts used in defining, categorising and classifying innovations. Chapter 3 gives a broad overview of these various definitions and concepts and then Chapters 4-8 focus on specific issues: process innovation (Ch. 4); product and service innovation (Ch. 5); innovative pricing (Ch. 6); network effects (Ch. 7); and intellectual property (Ch. 8).

How Firms Achieve Innovation

Part III (Chapters 9-14) examines some of the essential steps in the making of innovations. This starts with a summary of various theories of creativity (Ch. 9), which originate outside economics, but about which the economist should have a basic understanding. We then turn to theories of the entrepreneur (Ch. 10). Although entrepreneurship and innovation are not the same thing, there is an important overlap between them. Chapter 11 describes how firms organise for innovation and shows that there are two leading models for such organisation depending on the type and source of the innovation. Chapter 12 explores the role of technology vision in organising for innovation. Then Chapters 13 and 14 address two phenomena which explain the macroeconomic organisation of innovation: industry clusters (Ch. 13) and the division of labour (Ch. 14).

Innovation and the Consumer

Part III (Chapters 15-16) examines the consumer response to innovation. While most of those reading this book will be familiar with just one neoclassical economic theory of the consumer, we shall show that a proper understanding of how customers react to innovation requires us to understand a broader range of theories of consumption. Chapter 15 describes six different theories of the consumer, starting with the traditional economic consumer but

also including other theories from heterodox economics, sociology and anthropology. Chapter 16 draws out the connections between these theories of consumption and the diffusion of innovations, a topic of central interest in the economics of innovation.

The Effects of Innovation

In Part V (Chapters 17-21), our attention will focus on the effects of innovation on the broader economy. This can be analysed at various different levels. Chapter 17 looks at the implications of innovation for trade patterns. Chapter 18 examines the inter-relationship between innovation and market structure. This is a bi-directional relationship, since innovation changes market structure but market structure also influences the incentives for and scope for innovation. Chapter 19 looks at the role of innovation in wealth creation, and argues that the channels through which innovation can create wealth are both more numerous and more complex than is generally understood. Chapter 20 looks at the implications of innovation for competitiveness. We have separated the discussion of Chapters 19 and 20 because, while some may think that competitiveness and wealth creation are more or less the same thing, that is not really the case. Finally, Chapter 21 takes a brief look at the role of innovation in supporting a sustainable economy. This chapter will reveal two sides of innovation. It can sometimes help achieve sustainability but can also – perhaps unexpectedly – be a serious threat to sustainability.

Innovation and Government

Finally, in Part VI (Chapter 22), we look at whether government has a role in supporting and directing innovation. Chapter 22 argues that the past and present case for government involvement in innovation have been based on the argument that markets may not provide enough incentives for all innovation activities, and government has a role to correct this market failure. But beyond that, and beyond government's understandable wish to focus public resources on sectors where a country can be a serious competitor in the world market, there is no attempt on the part of government to decide on the direction of innovation. In a brief postscript to Chapter 22, we argue that government policy towards innovation will in future have to become more subtle if innovation is to support a sustainable economy and not make economic activity even less sustainable.