Preface

The relations between innovations, growth and employment are extremely complex, but also very important from a socioeconomic and political point of view – and thereby from a research and policy point of view. The complex whole can be divided into the relations between (1) innovations and growth, (2) innovations and employment and (3) growth and employment. These relations are represented in Figure P.1.

![Figure P.1: Interrelations of innovation, growth and employment](image)

Innovations and employment (‘2’ in Figure P.1) will be the main focus in this book. However, we will also address the relations between growth and employment (‘3’ in Figure P.1). Let us here set the stage for this discussion.

When politicians discuss remedies for the unemployment problem, they often claim that more rapid growth is what would solve or mitigate it. Such a statement is unclear in the sense that it does not specify what kind of growth is meant. Is it, for example, economic growth (GDP growth) or productivity growth? Everyone talking about ‘growth’ and employment should be specific on this issue, since the employment consequences of these two kinds of growth are very different!
Innovation and employment

It is increasingly important for both policy makers and social scientists to make such distinctions, and to clarify their implications for employment, given the rise in recent years of public concern about the idea of ‘jobless growth’ due to technological unemployment. Popular works articulating such concern – for example, Jeremy Rifkin’s book on *The End of Work* (Rifkin, 1995) – have gained a very broad audience. In the policy literature there has been a growing realization that ‘we are once again passing through a period in which a gap is opening up between the speed of technical progress … and our capacity to … provide new job opportunities’ (Commission of the European Communities, 1994: 4).

As the OECD *Jobs Study* (OECD, 1994a, 1994b, 1994c) argues, it is necessary to develop a more detailed and differentiated understanding of the relation between ‘growth’ and employment, since some kinds of ‘growth’ destroy jobs while other kinds create jobs. The OECD study has therefore emphasized that the development of adequate solutions to the problem of high unemployment will depend, in large part, on a ‘dynamic perspective’ on technology/employment relationships – one that ‘emphasises the role of innovation and technological advance in the very processes of growth and structural change’ (OECD, 1994b: 165). From such a perspective, it can be seen that some kinds of growth reduce employment and other kinds increase employment. Hence, the ‘employment intensity of growth’ differs between various kinds of growth, and the source and content of growth have significant employment implications (Commission of the European Communities, 1994: 57–60).

A crucial question therefore arises: which kinds of growth lead to more jobs and which do not? This is a central question addressed in this book.

We analyse types of growth mainly through a taxonomy of different kinds of innovations. The main categories relate to the dichotomies of product versus process innovation and manufacturing versus service production. However, each category is in turn further differentiated. This is done by distinguishing types of process and product innovations, and by relating the inputs of knowledge (levels of R&D or human capital) involved in different kinds of production to their innovative output.

To the extent possible, our analysis specifies the employment consequences of different types of innovations. This is done at various levels of analysis – from the micro level of the firm, through sectoral and national levels of economic organization, to the international or global level. However, because of the bias in the availability of data, the sectoral level will be addressed most thoroughly.

The book has three parts. Part I addresses the theoretical approach and conceptual framework. Part II discusses the relationship between innovations and employment, using existing empirical material in order to analyse how
different kinds of growth affect job creation and destruction. Part III summarizes findings and presents conclusions and policy implications.

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In its original form this book was presented and discussed on several occasions as a research report within the ISE research project. The authors wish to thank those ISE members who commented on earlier drafts of the manuscript: Birgitte Gregersen, Johan Hauknes, Björn Johnson, Mireille Matt, Svend Otto Remoe, Keith Smith and Morris Teubal. We are indebted to them and to the whole ISE group for their collegial assistance. We are grateful to the Swedish Council for Research on Working Life (RALF) and the Swedish National Board for Industrial and Technical Development (NUTEK) for funding that helped us to complete this project. Björn Elsässer and Jan Fagerberg also deserve our gratitude for having read and commented on later versions of the manuscript. In addition, the authors wish to acknowledge the support and advice provided by colleagues in the Systems of Innovation Research Programme at the Department of Technology and Social Change of the University of Linköping, Sweden. Naturally, the authors accept all responsibility for any faults in this book.

NOTES

1. We will also return to the issue of growth and employment in later sections, including Part III, where Chapter 6 presents our main conclusions.
2. ISE consisted of nine research groups in nine European countries. It had the overall purpose of elaborating the systems of innovation approach with respect to:

   (1) Evaluation of this new understanding of the development of science, technology and innovation and the implications thereof for economic growth and employment.
   (2) Developing new policy options and implications on this basis.

Two summary reports were produced within ISE. The reader interested in policy issues is advised to consult The ISE Policy Statement (Edquist et al., 1998), which is written for politicians and policy makers concerned with innovation policies and policies closely related to this field, for example, policies dealing with education, R&D, economic growth and employment. It deals with policy implications in an integrated manner.
The second report is *The ISE Final Report* (Edquist, 1998), which describes and summarizes the basic scientific findings and policy implications for each of the sub-projects in ISE. The sub-projects were clustered in two phases:

1. **Policy implications of the state of the art**
   - Policy implications of systems approaches to innovation
   - Innovations, growth and employment
   - European integration and national systems of innovation
2. **Issue-oriented empirical sub-projects**
   - Science-based technologies and interdisciplinarity
   - Public technology procurement as an innovation policy instrument
   - Financing innovation
   - Corporate governance and innovation performance
   - Technological entry: diversification vs new innovators

Thirty-one research reports were produced on these issues in the sub-projects of phases 1 and 2. It is necessary to consult these research reports for the detailed basis of the arguments presented in the two summary reports. The research reports, together with the two summary reports, are all included on a CD-ROM titled *ISE: Innovation Systems and European Integration* (Edquist and Texier, 1998). The CD-ROM is available, free of charge, from the Systems of Innovation Research Programme, Department of Technology and Social Change, University of Linköping, Sweden. All the material contained in the CD-ROM is also available on the Internet at the following address: http://www.tema.liu.se/tema-t/sirp/index.htm.