15 The Emerging Digital Economy: Conclusions

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15.1 Introduction

This book has been compiled with the purpose of adding to the complex picture of possible impacts of information and communication technologies (ICTs) with a special focus on spatial effects and, at the same time, hopefully, in some instances, making the picture more comprehensible. This concluding chapter creates a synthesis of the major aspects of the book and lessons for future research, and explores avenues for public policy making in the emerging digital economy.

It is appropriate to devote attention to the effects of the generation, diffusion and the use of ICTs, because they represent a new technological paradigm that belongs to the family of general purpose technologies (GPTs). A GPT has the potential for pervasive adoption and adaptation in a wide range or even all sectors in ways that drastically change operations and products as well as the relationships between different sectors. The characteristics of GPTs have been described by Bresnahan and Trajtenberg (1995, p. 84): “Most GPTs play the role of ‘enabling technologies’, opening up new opportunities rather than offering complete, final solutions.” General purpose technologies also involve ‘innovational complementarities’, i.e. “the productivity of R&D in a downstream sector increases as a consequence of innovation in the GPT technology”.

Thus, GPTs have two major characteristics: generality of application; and, innovational complementarities. However, other characteristics of GPTs are also important (Lipsey et al. 1998): (i) much scope for improvement initially, (ii) many varied uses, (iii) applicability across large parts of the economy, and (iv) strong complementarities with other technologies.

Luc Soete, in Chap. 2 in this book, does not use the GPT concept when he characterizes ICT but instead he characterizes ICT as ‘a break-trough technology’. However, there is not a major distinction between the two concepts. The characterization of ICT as ‘a break-trough technology’ is supported by the following arguments:

- There is a dramatic and seemingly continuous technological improvement in the capacity of semi-conductors (e.g. Moore’s Law) that has led to a gigantic increase in the capacities and speed of computers to store and process data.
There is the tendency to miniaturise ICT components, (e.g. wearable electronics).

There are the almost equally radical and significant technological improvements in the area of telecommunications.

There are specific developments in the area of mobile communication.

There are developments in the field of supporting technology, such as software and other communication standards, in particular Internet protocols (for example WWW), mobile communication standards (such as GSM, WAP and UTMS), and location based systems that it supports (e.g. GPS).

When these factors are particularly strong, as in the case of ICT, they lead to fundamental changes in the way economies and societies are organised, in how production is performed and which products are produced. In other words, they impact not only the superstructures but also the infrastructures of existing economies. They reshape the macro-economic conditions of economies, the conditions for R&D and innovation and the structure of markets by changing conditions for competition and entrepreneurship including the introduction of new industries. Further, they impact the demand for knowledge and skills and the functioning of labour markets, the internal organisation of firms as well as the structure of the relationships between firms. Finally, the factors determining the location of firms and households as well as the territorial competition between functional regions are transformed by the conditions for public policy at all levels from the local to the international.

The fundamental changes of economies and societies initiated and stimulated by the developments within ICT and the diffusion of ICT have led to the emergence of a digital economy. The contributions presented in this book highlight three important aspects of this emerging digital economy:

- Clusters, innovation and entrepreneurship
- Location and dynamics of ICT industries
- Telecommunications and policy

By bringing these essays together, we hope to encourage further exploration of these aspects of the emerging digital economy. The purpose with this final chapter is to summarize some of the findings in these essays and to point out important areas for future research.

15.2 Clusters, Innovation and Entrepreneurship

A basic observation is that economic activities are clustered in space. Krugman (1991) finds the geographic concentration of production to provide evidence for the pervasive influence of some kind of increasing returns. When many firms in one sector cluster together geographically, an industrial or sectoral cluster is said to exist. Inside such a cluster one or several forms of direct and/or indirect in-