1. Introduction to ‘Innovation Everywhere’

1.1 A CHANGING WORLD – CAN WE MEASURE WHAT IS HAPPENING?

This book is about the measurement of innovation and the use of the resulting indicators to shape policy. The question that recurs throughout the book is whether, in a rapidly changing world, innovation can be measured everywhere, not just in the business sector.

This question is well established in the literature, but the world in which innovation happens is changing, as are the options for measurement and the ways of informing policy development. This suggests that measurement, and the means of influencing policy, be examined closely, taking note of the impact of the digital economy which is transforming business, governance and social activity.

Only recently have people had access to ‘smart phones’ that connect them to apps that help them travel, provide information when needed, tell them the state of the weather, stock market activity, or the trading value of their currency. If they want to assemble a lawnmower, a video can be found that takes even the most inept person through the process in easily understood steps. The phrase, ‘there must be an app for that’, whatever ‘that’ may be, is frequently confirmed. There is an app for that.

People are well served in the digital world by having their own email, iCloud storage, access to platforms where trades can be made, and knowledge exchanged. There are diagnostic apps that will interview patients and refer them to the right medical department and these machines learn. This is different from the 1990s, and earlier, when every application was written by a (human) programmer. Now, the app can learn from its interactions and revise its own algorithm. The digital divide (access to computers) is vanishing as smart phones and other digital devices spread and the knowledge divide (there is a computer available but there is no knowledge of what to do with it) is being removed, not by people but
by machines that tell you what you can do with it. This raises another question of what you should or should not do with it.

In the 2020s there are new issues. The app will help you do what you want, but it, in return, wants to know where you are, to have access to your contacts and it may read your email and keep track of the web sites you visit. The justification is that the app can give better service to you if it knows more about you. However, there are other less friendly apps in cyberspace that want the same information to commit cybercrime of some kind. The world is digital and there are good things as well as bad things to be considered.

While the digital economy is changing the way in which people behave, it also is changing the way business and public institutions are functioning. Facial recognition is an issue in public space and artificial intelligence (AI), used by a business in its transactions with government, other businesses and people, is raising questions about privacy, confidentiality and security of the data being used.

The challenge is to produce indicators of innovation, to use the indicators to show what the outcomes of innovation policy are and then how to evaluate the policy so that it can meet the desired target. Measurement matters.

1.2 INNOVATION MEASUREMENT

Innovation is everywhere. New or improved products and processes are made available to potential users or brought into use by the business, institutions of higher education or households, but nowhere in the international standard definitions of innovation is there a statement of whether the innovation is good or bad. Financial services can produce product innovations that damage the economy, local government can move the disadvantaged from their communities to high-rise apartment blocks as an outcome of social innovation, and households, or individuals, can develop or modify products that improve their satisfaction, but may also increase risk. If desirable outcomes (inclusiveness, sustainability, jobs and growth …) are required, restrictions must be imposed on the measurement of innovation which may require more than one measurement over time to confirm the progress, or not, towards the desired outcomes.

What is different in 2020 is that the Oslo Manual, which provides guidelines for the measurement of innovation, has, in the fourth edition (OECD/Eurostat 2018), provided a general definition of innovation that can be used to measure innovation and innovation activities in the same
way in all economic sectors. It also supports the measurement of the network that connects the actors in an innovation system. These linkages can be feedback loops that interact with one another, as well as with the actors, and result in non-linearity of response to policy interventions. This makes it difficult to predict the outcomes of changing policy. Innovation happens in a multi-connected complex system.

The fourth edition of the *Oslo Manual* has moved from being a manual used by European Union (EU) Member States and OECD Member Countries, and observers, to an international standard applicable in all countries. That is a significant step which is discussed in Chapter 6.

### 1.3 POLICY

Innovation policy is designed to promote innovation and the view over many years is that innovation occurs in the business sector and leads to jobs and growth. There is also a view that promoting research and development (R&D) gives rise to more innovation and in some countries innovation policy is R&D policy and R&D policy is tax policy. Are these the innovation policies for the 2020s and the digital economy? Changes in policy making in a digital economy, and how such policies are monitored and evaluated, are discussed in Chapter 10.

Innovation does occur in all economic sectors and it can support sustainable development, greater inclusion, and green outcomes to limit climate change. The question that this book addresses is how the implementation of these restrictions on innovation, and the outcomes, can be measured. Without measurement there is no monitoring of implemented innovation policy and no basis for evaluation which is needed for policy learning.

All countries, but especially developing countries, have innovation in their informal economy. Understanding how innovation happens in the informal economy is another researched field, but an important one, as it leads to the question of how innovation policy should influence innovation in the informal economy.

‘Social innovation’ is pervasive, but there is no internationally supported definition of social innovation. That does not make it any less important, but the discussion in Chapter 10 is whether social innovation can be measured and what a social innovation policy might look like.
1.4 STRUCTURE OF THE BOOK

The book has four parts. Part I comprises this introduction and a review of innovation systems in Chapter 2. Innovation systems occur in Part I as innovation is a systems phenomenon and innovation systems provide the framework for the topics in the rest of the book.

Part II starts with current innovation policies in Chapter 3, followed by scoreboards and their use for monitoring existing innovation policy in Chapter 4. Chapter 5 returns to innovation policy, but with a focus on implementation. The discussion is about whether innovation policy should involve the whole of government, or several separate policies managed by different government departments. Implicit is the view that innovation occurs in the business sector. Part II also raises questions about how to deal with innovation in all the economic sectors which are discussed in Part III.

Part III deals with the statistical measurement of innovation. Chapter 6 introduces the general definition of innovation applicable in all economic sectors, not just the business sector. This is a major step as it provides a standard definition at a time when the economy, and measurement of innovation in the economy, are changing rapidly. The chapter also introduces restricted innovation and how measurement takes account of restriction. Examples of restrictions already mentioned are ‘inclusive’ and ‘sustainable’ innovation. Innovation policy makers want to know about inclusion and sustainability as well as about jobs and growth. Chapter 6 also introduces the importance of language and how it is used in the innovation discourse.

Chapter 7 presents the conceptual framework for the specification of the statistical measurement of innovation. It is the application of the general definition of innovation (Chapter 6) to all economic sectors of the System of National Accounts (SNA), combined with the systems approach to innovation (Chapter 2). This provides guidance to measurement in developed and developing countries, an important change in the fourth edition of the *Oslo Manual* compared with previous editions. Another consequence of the use of the general definition of innovation is its application in the business sector. This was not done in the fourth edition of the *Oslo Manual* as the manual has been, and still is, a guide to measuring innovation in the business sector. Applying the general definition to the business sector and examining the role of zero price digital products raises questions addressed in Chapter 10.
While Chapter 7 deals with innovation in all economic sectors of the SNA, there are some forms of innovation that are not sector specific. Chapter 8 deals with them. They include innovation in the informal economy, eco-innovation for the green economy, social innovation and innovation resulting from the use of general purpose technologies and practices leading to the ‘fourth industrial revolution’.

Part IV continues the discussion of the current state of innovation policy in Part II, and of statistical measurement of innovation in Part III, to pose the question, ‘Where next?’ Part IV starts, in Chapter 9, with a discussion of innovation and global challenges. The first is innovation and sustainable development and the 17 Sustainable Development Goals (SDGs) which are to be realised by 2030. The imposition on innovation of it being sustainable is an example of ‘restricted innovation’ raised in Chapter 6. The SDGs are followed by discussion of innovation and climate change and the green economy. Both are cases of restricted innovation. Chapter 10 considers the future of innovation in the digital economy, the informal economy and social innovation. It then looks at a series of issues that should stimulate innovation studies in the 2020s. These include the digital economy and its impact on innovation measurement, the Science of Innovation Policy and its impact on policy making and implementation. Chapter 11 concludes and poses some questions to the reader about where innovation measurement and policy are going.