Chapter 1

Innovation

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WHAT IS INNOVATION?

A lot has been written on the subject of innovation. More than 250 books were published with the word “innovation” in their title in just the first 3 months of 2012, and the term appeared more than 33,000 times in 2011 alone, in the annual and quarterly reports filed with the US Securities and Exchange Commission (SEC), a 64% increase from 2006 (Kwoh, 2012).

The word “innovation” has come to mean a lot of different things to a lot of different people, and as is typically the case with words in vogue at different periods in time, this word has been used and abused to the point where the word may have begun to lose its meaning. While the word is derived from the Latin noun innovatus and appears in print as early as the fifteenth century, the more modern interpretation and expounding of it go back to the famous economist Joseph Schumpeter and his writings in the 1930s (Schumpeter, 1934).

In 1934, Schumpeter added a definition of “innovation,” or “development,” as “new combinations” of new or existing knowledge, resources, equipment, and other factors. He pointed out that innovation needs to be distinguished from invention. The reason why Schumpeter stressed this difference is that he saw innovation as a specific social activity, or “function,” carried out within the economic sphere and with a commercial purpose, while inventions in principle can be carried out everywhere and without any intent of commercialization. Thus, for Schumpeter, innovations are novel combinations of knowledge, resources, etc. subject to attempts at commercialization—it is essentially the process through which new ideas are generated and put into commercial practice. This “combinatory” activity he labeled “the entrepreneurial function” and the social agents fulfilling this function “entrepreneurs.” For Schumpeter, these are keys to innovation and long-run economic change (Fagerberg, 2008).
After this early discussion of innovation and entrepreneurship, the next authoritative work on this subject was due to the famous management guru Peter Drucker in the 1980s (Drucker, 1985). Peter Drucker defines “innovation” in his 1985 book “Innovation and Entrepreneurship” as: “Innovation is the specific tool of entrepreneurs, the means by which they exploit change as an opportunity for a different business or a different service. It is capable of being presented as a discipline, capable of being learned, capable of being practiced. Entrepreneurs need to search purposefully for the sources of innovation, the changes and their symptoms that indicate opportunities for successful innovation, and they need to know and apply the principles of successful innovation.” It is clear from this definition that (1) innovation is not just about inventions or about new technology, but about new business opportunities created through new technologies, products, services, processes, business models, etc.; (2) innovation is not something that just happens by itself, but is a structured or systematic process that requires discipline and that can be learned and practiced; and (3) in order to succeed at innovation, you need to be proactive and search for the sources of innovation and exploit them. Innovation is a process for creating and introducing something new, novel, or advanced with the intention of creating value or benefit (Hisrich and Kearney, 2014). Innovation is a process that begins with a new idea and concludes with market introduction.

In the 1990s and beyond, Clayton Christensen of the Harvard Business School wrote extensively on the subject (Christensen, 1997; Christensen and Raynor, 2003, Christensen et al., 2004; Dyer et al. 2011). In more recent years, there have been a plethora of writings on the subject of innovation and various interpretations of the term. The intent of this work is not to debate the subject or to delve into the various interpretations, definitions, types, or applications of the term. Instead, we will first look at why innovation is important and what are the various factors that contribute to it and explore how these factors differ across some of the regions of the world, more specifically across the United States, China, and India. In order to facilitate that, we will use the definition of innovation as used by Schumpeter or by Peter Drucker, viz., innovation results from the application of knowledge and results in new business opportunities, regardless of whether these are the result of innovations in technology through innovations in process, product, or service or innovations in business models and business processes.

**WHY IS INNOVATION IMPORTANT?**

Innovation is important because it results in new business creation, which in turn drives economic growth. This is true whether these new businesses are new start-ups or whether they are new businesses within existing enterprises, and the latter has been described more recently as intrapreneurship. While these start-ups or existing enterprises benefit from these innovations in the form of increased revenues and increased profits, the net effect in the aggregate is a growth of the national and global economy.

Economic growth is measured as the annual rate of increase in a country’s gross domestic product (GDP) and is a measure of the general well-being of the
people in that economy. Economists, such as Schumpeter (1934), Solow (1956), and, most recently, Acemoglu (2009), Aghion and Howitt (2009), Barro and Sala-i-martin (2004), and others, who have studied factors contributing to economic growth, have shown that economic growth cannot be explained only by the increasing application of factors of production, viz., capital and labor. Specifically, per capita GDP cannot grow in the long run unless one assumes productivity also grows, which Solow refers to as “technical progress.” What are needed in addition to capital and labor, to explain economic growth, are additional factors. Several innovation-based models have been used to explain economic growth. In one model, innovation causes productivity growth by creating new, but not necessarily improved, varieties of products (Romer, 1986a,b). Another model is based on “quality improving innovations that render old products obsolete” and hence involves the force that Schumpeter called creative destruction (Aghion and Howitt (1992) in Aghion and Howitt, 2009). We will discuss these theories and others in Part III of the book.

FACTORS CONTRIBUTING TO INNOVATION

The next question we address is what factors affect innovation in a given society. The Global Innovation Index (GII), prepared by the World Intellectual Property Organization and INSEAD for the year 2013, gives an overall score and ranking of innovativeness for 142 countries. These indices have been constructed using five input and two output subindices (Fig. 1.1).

![Figure 1.1](image-url) Framework for the Global Innovation Index (GII).
The radar diagram (Fig. 1.2) shows the scores of the three countries for each of the seven subindices. From the diagram, it is evident that the United States provides good institution and market sophistication inputs, although in terms of human capital and research, infrastructure, and business sophistication, there is a lot of scope for improvement. In terms of output, the United States seems to produce more knowledge and technology outputs than creative outputs. China produces almost similar levels of knowledge and technology outputs as China and is better equipped than India in terms of human capital and research, infrastructure, and business sophistication. India produces more creative outputs than China and provides better institutional input and almost similar levels of input in terms of market sophistication.

The United States ranks 5th out of 142 countries in the GII, while China ranks 35th and India 66th. The overall GII score for the United States out of 100 is 60.3, while it is 44.7 for China and 36.3 for India. Both India and China need to catch up in almost all the input indicators as compared to the United States. Technologically, India seems to be lagging far behind the other two larger economies of the world.

This book goes into further detail and examines more factors that impact innovation specific to each of these three countries. The factors range from historical perspective (as an indicator of potential proclivity towards innovation), cultural factors, economic factors, laws and rules and the role of government and other institutions specifically geared towards promoting innovation (as indicators of infrastructural and institutional frameworks and overall business and market sophistication), demographics and education system (as indicators of human capital and research), to industry and market structures, including any

![Global Innovation Index 2013](source: Global Innovation Index 2013: The Local Dynamics of Innovation by WIPO and INSEAD.)
industry or regional innovation clusters (as an indicator of level of sophistication of innovation across various industries of each of the economies).

Based on the analyses of the above factors, the section on innovation concludes by identifying the gaps in innovation in each of the economies taking into consideration the relevant local factors and conditions.

REFERENCES

Global Innovation Index (GII), 2013.