Chapter XXII
International Dimensions of Innovation in Technology

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ABSTRACT

This chapter develops a set of seven dimensions, which may be applied to each sovereign nation as a guide to allow for systematic consideration and comparison of opportunities and challenges across borders. Under the assumption that innovation itself requires a unique set of skills or opportunistic settings, the chapter then explores each dimension's applicability to situations particularly associated with innovation in technology. Using current research and examples from world business, the chapter moves to a brief discussion of projected future developments in the field and related research needs.

INTRODUCTION

"*There is no reason anyone would want a computer in their home.*" (Ken Olson, president of Digital Equipment Corp. 1977, speaking to the World Future Society and quoted in TIME magazine.)

World businesses may have been slow to recognize the potential for global impact through information technology, and, while the arrival of the microchip and the earliest desktop computers was derided by some and heralded by others, few today would deny the significance of technology in the hands of the masses.

The lifeblood of technology is innovation, and the greatest growth in research and development spending today is taking place not in the United States or Europe but in China and India (Jareszelski, Dehoff, & Bordia, 2006). While, admittedly, that spending may be coming from developed nations' purses, the decision-making as to where, how, and why to innovate is leading the world to the east.

Peering into the chaotic maelstrom where the vortices of technology, innovation, and

globalization brew the future is vital. Even the smallest entrepreneurial organization must learn its elements. At the same time, the work of understanding it is challenging, frightening, and hopeful. The microchip—itself an innovation of as-yet-unknown proportion—powers the world wide engine and enables the interaction of societies and peoples known to one another only through myth and legend before its invention. The three notions—globalization, innovation, technology— are inextricably intertwined. This chapter aims to explore the contextual elements that enhance or inhibit fruitful interaction among the three.

BACKGROUND

Innovation. Simply put, one might define innovation by its Latin derivation: *in novare*—to make new. Its simplicity belies the potential uses and distortions of the term, however. As an example, Lotte Tarso, in her book, *Innovation in the Making* (2001) identifies and distinguishes among four types of innovation:

1. **Incremental:** Innovations are improvements of processes, products, and methods, often found by technicians or employees during their daily work.
2. **Radical:** Novel, surprising, and different approach or composition.
3. **Social:** Spring from social needs, rather than from technology, and are related to new ways of interaction.
4. **Quantum**: Refers to the emergence of qualitatively new system states brought by small incremental changes.

For purposes of this chapter, innovation is defined as the process of creating something new which has a significant result—whether within or outside of some prior context. This definition would include both process and product innovations, but would exclude small modifications of process or product. The "innovation" here specified must be genuinely "new." As such, the definition appreciates the remarks of Alan Greenspan (2004), former Chairman of the U.S. Federal Reserve Board to the Federal Reserve Bank in Chicago: "Innovation, by its very nature, is not forecastable."

Technology. Somehow, it seems fitting to turn to the internet and its ubiquitous "Wikipedia" for a definition of technology, which is at once comprehensive and well suited to the goals of this chapter:

(Gr. technologia (τεχνολογία) < techne (τέχνη) "craft" + logos (λόγος); "reason") Technology predates both science and engineering. It may be defined as: "Solutions for real human problems by the development and application of tools, machines, materials, goods, or information in the form of skills, knowledge, processes, blueprints, plans, diagrams, models, formulae, tables, engineering designs, specifications, manuals, or instructions."

This definition provides the opportunity to stress that technology is not a derivative of the 20th and 21st centuries. Quite the contrary, as pointed out by Michael Bordo, international business itself began when trade across distances was facilitated by ships—a form of technology that required no microchips!

The definition is adopted here also because it omits the usual emphasis upon commercial needs and applications of innovation, thus recognizing the possibility for innovative enhancement of the quality of life as well as economic success. And, although many would infer that technology speaks specifically to information or communication-related developments, this definition would clearly include all forms of human solutions such as biotechnology, energy technology and, yes, those technologies yet to come.