

## Chapter 3

# Technological Development, Growth, and R&D Management in the USSR

Both policy makers and scholars from the East and West have expressed a need for an up-to-date and comprehensive account of the actual state, structure, and progress of research and development management and organization in, what was until recently, the Soviet Union. Certain aspects of R&D in the USSR have been reviewed and analyzed in the literature, but a thorough overview from Western sources supported by actual Soviet data would be beneficial to gain an understanding of this complex system during the time of economic transition. This study aims to provide this understanding.

Many economists and additional experts from other fields are now involved in attempts to provide alternative approaches to resolve the difficulties and determine the origins associated with a rate of technological development that has increasingly been unable to offset the effects of the growing resource scarcity and increasing demand for consumer goods. The dilemma is intensified by the desire to maintain the verified potential of the largest scientific establishment in the world that is, at the same time, plagued by enormous inefficiencies and has been relatively isolated from market activities and production techniques, to say nothing of the international community. In order to approach the existing problems in a suitable manner, the research requires an analysis of the conditions or circumstances that brought about the unique characteristics of the Soviet economy.

### 3.1 Technological Development, Growth, and R&D Management

#### 3.1.1 Technological development

Technological progress has been generally accepted to be a major engine powering economic growth and development; it has been acclaimed as one of the most influential forces in the transformation not only of productive relationships, but also of whole cultures (Rosegger, 1980, p. 1). Proof of this has been evident since the Industrial Revolution in the eighteenth century.

In the past, changes in the management and development of technology have by no means taken place in a smooth fashion. Although technological advance appears to occur at a continuing rate, transitions in technological development amplify or reorient the process of change. Schumpeter uses the phrase “creative gales of destruction.” Three such transitions have molded modern technological development and influenced the importance and management of factors supporting R&D:

1. In the late eighteenth century and early nineteenth century, new production techniques emerged and the need arose to rethink the organization of labor and other factors of production to adequately fulfill the growing significance of efficiency and utility as goals.
2. Late in the nineteenth century, rationalization occurred by integrating scientific advances and modification of techniques into what today is termed technology with the development of comprehensive organizational strategies for production and processes. Close ties between production and R&D, as well as its benefit-oriented management, were becoming necessary. The result was organized innovation: a process of moving away from the inventor-entrepreneur. Those who were originally individual inventors became employed as researchers, while managers, systems engineers, and financial experts took over the entrepreneurial role in innovation.
3. In the second half of the twentieth century, the third transition was under way: the reorientation from energy toward information and communication. More than the technological transitions before it, the third is as yet the most demanding with respect to a need for strategic thinking, planning, and policy development (following Rip, 1989, p. 142). To be successfully competitive in an open environment most favorable for economic growth and development that will result in a higher standard of living, production must be characterized by diffusion and utilization of technologies based on R&D management that reflects changes in the expectations of profits and alterations in demand.