

Growth and Innovation in the Centralized Economy of the Soviet Union: a Historical Perspective

Dmitriy Chulkov (Indiana University Kokomo, United States)

Scientific research and innovation play a key role in creating and sustaining economic growth. There are profound differences in the political structure of nations and the organizational architecture of firms (Sah and Stiglitz, 1986). Organizations may choose to set up the screening of innovative research projects in either a centralized or a decentralized fashion - often referred to as a hierarchy and a polyarchy.

The experience of the centralized approach to scientific research is illustrated by the economic history of the Soviet Union. Prior studies conclude that innovation failures have been a major cause for the technological gap between the Eastern and Western countries in the latter part of the twentieth century (e.g. Amann and Cooper, 1986). Following the break-up of the Soviet Union, the general perspective on innovation in its centralized economic system has been that of failure, however a careful examination of the evidence demonstrates periods of remarkable growth followed by a slowdown.

In an analysis of the decline of the Soviet economy, Allen (2001) argues that “the Soviet Union was one of the great experiments of the twentieth century, and it behooves us to analyze its history carefully to see what worked well, what worked badly, and why.” Such analysis is bound to provide insight into the optimal design of the innovation process, as the centralized approach to scientific research and innovation funding continues to be wide-spread.

In this study, I examine the historical evidence on the economic and scientific performance in the centralized economy of the Soviet Union, and discuss the consistency of several theoretical models with the evidence. In particular, I focus on the model of research screening in hierarchies and polyarchies. I present the empirical evidence on the hierarchical nature of decision-making in the Soviet economy and the history of the reforms to the Soviet decision-making hierarchies and their impact on the record of scientific research and innovation. A key contribution of the study is in establishing a theoretical link between the reform of the economic decision-making that re-created and expanded all-union ministry structure in the Soviet Union in 1965 and the subsequent slowdown of innovation and growth.

Even as the Soviet system appeared rigid on the outside, it was subject to a number of reforms with two major changes - the SovNarKhoz reform initiated by Khruschev in 1957 and the resurrection of the ministerial structure by Brezhnev and Kosygin in 1965. The SovNarKhoz reform created integrated territorial organizations for economic decision-making as the Soviet economic system was changed from a unitary form (U-form) hierarchy to a multidivisional form (M-form) hierarchy (Markevich and Zhuravskaya, 2011). After Khruschev’s removal from power, the SovNarKhoz system was officially dissolved and the traditional U-form economic hierarchy was re-created in September 1965. The new economic structure enhanced the role of the all-union ministries, sharply increasing their number compared with the situation before

1957. New a hierarchy of all-union, union-republican, and purely republican ministries was created.

Several conclusion follow from this historical case study and the analysis of decision making in hierarchies and polyarchies. Centralized organizations may be viewed as hierarchies, and decentralized ones as polyarchies. In hierarchies, Type-I errors (reject a project that turns out to be successful) are more likely, while Type-II errors (accept a project that turns out to fail) are less likely. This fact is relevant to explaining why bureaucracies rely on hierarchical screening. Aversion to Type-II errors will be strong if the decision-makers are punished for failure and face negative incentives. In such cases, hierarchical screening will be preferred by the decision-makers. Organizations that face high uncertainty in the project pool may gain by applying hierarchical decision-making as the additional levels of screening eliminate Type-II errors. Christensen and Knudsen (2010) describe how combinations of both hierarchical and polyarchical elements may be used to reduce decision errors and improve screening.

The innovation process is complex and is unlikely to be completely explained by a single model. The purpose of this paper is in identifying the factors that affect innovation in centralized economic systems, and evaluating the theories against the empirical literature. Empirical evidence paints the picture of a sharp slowdown in both innovation and economic growth in the Soviet economy. The theoretical explanation most consistent with this evidence is based on the hierarchy decision-making model. The dramatic re-organization of the Soviet economic decision-making with the introduction of the all-union ministries in 1965 led to higher centralization and a larger number of hierarchical decision levels. The observed slowdown in innovation is consistent with this change. Understanding the implications of the innovation screening organizational architecture helps reach optimal outcomes in innovation management.