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Technological Forecasting & Social Change
71 (2004) 897–912
Technological Forecasting and Social Change

Emergent foresight processes: industrial activities in wireless communications

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Received 29 May 2003; received in revised form 31 August 2003; accepted 2 September 2003

Abstract

Technology foresight has received growing attention among those involved in the shaping and implementation of science and technology (S&T) policies. However, although evaluative analyses of foresight exercises have supplied evidence on acclaimed benefits—such as the generation of future-oriented knowledge and strengthening of collaborative networks—they also point to challenges in translating foresight results into actions within research and technology development (RTD) organizations. In this article, we address these challenges by considering the work of the Wireless World Research Forum (WWRF), which has sought to promote the conception, development, and diffusion of wireless communication technologies. Specifically, by contrasting this work with well-known government-initiated foresight exercises, we typify so-called explicit, emergent, and embedded foresight activities and explore their interrelationships. Our comparative analysis points to conditions under which policy interventions may not be needed for the emergence of foresight activities that exert a major influence on RTD agendas. It also suggests several context-dependent roles for public policy, among which government-driven foresight exercises and the catalysis of more narrowly focused activities are but two examples.

Keywords: Technology foresight; Science and technology policy; Innovation studies

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doi:10.1016/j.techfore.2003.09.001

1. Introduction

Fundamentally, the rationale for technology foresight derives from the widely held perception that a deliberate future-oriented consideration of scientific, technological and societal developments is conducive to innovation, economic growth, and societal well-being [1]. Within this setting, technology foresight has sometimes been seen as a structured approach for setting priorities for science and technology (S&T) resource allocation [2], while at other times the emphasis been placed on the dialogue process that underpins Martin and Irvine's [3] five C's, i.e., (i) concentration on the longer term, (ii) improved coordination among the stakeholders' visions, intentions, and actions, (iii) consensus on research areas that seem particularly promising, (iv) more intensive communication, and (v) commitment to the implementation of research and technology development (RTD) policies.

Although much of the foresight literature has been concerned with the shaping of S&T policies, foresight has also been defined in a less instrumental sense as "a purposefully organized process bringing together expectations of diverse actors about a technology, to formulate strategic views about the future that take into account broad social and economic developments" [4]. Additional nuances to this process-centric perspective can be given by noting that foresight need not be a stand-alone activity. Indeed, foresight processes can be *embedded* into other activities, for example, such as the management structures and communication processes of RTD programs [5]. Nor does a foresight activity have to consist of explicit phases and tasks through which "the foresight" is generated: rather, the process may evolve through iterative, incremental, and even experimental activities through which the stakeholders become more aware of future opportunities and commit themselves to actions that reflect their enhanced understanding. These and yet other dimensions of foresight activity can be best understood from complementary perspectives that have proven useful in the management of industrial RTD efforts [6].

While recent evaluations of foresight exercises have confirmed beneficial impacts (see, e.g., Ref. [7]), they have also pointed to challenges in the utilization of results (e.g., Refs. [2,8,9]):

1. There is an inherent tension in selecting the appropriate level of detail, or *granularity*, in analyzing key technologies [8,10]. On one hand, if technologies are defined narrowly, the list of technologies may become excessively long and hence unmanageable, whereby the foresight process cannot pay much attention to interconnections among technologies; on the other hand, if technologies are defined very broadly, the results may lack the level of detail that would be required to derive and implement recommendations in specific settings, such as RTD programs or industrial RTD centers.
2. There may be a tension between the "richness" of informational outputs from a foresight exercise, on one hand, and the usability of such outputs for subsequent action plans, on the other hand. For example, if the exercise is very rich in terms of alternative eventualities (e.g., through the consideration of a broad range of scenarios), it may be