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Innovation through initiatives—a framework for building new capabilities in public sector research organizations

Charlette Geffen[a,*], Kathleen Judd[b,1]

[a]*Pacific Northwest National Laboratory,*[2] *P.O. Box 999, 902 Battelle Blvd, Richland, WA 99352, USA*
[b]*Battelle Seattle Research Center, 1100 Dexter Ave N, Seattle, WA 98109, USA*

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Abstract

The accelerating pace of change in science and technology has resulted in new attention to the process of identifying and developing ideas that ultimately lead to new scientific capabilities and business opportunities for an organization. The need to refresh research programs and capabilities is as important in federally funded research institutions as it is for industry. This paper explores the critical success factors for new initiatives at a federal laboratory, and building on lessons learned through this study and in private industry, identifies a more systematic process that could potentially improve the effectiveness of these initiatives in achieving results.
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1. Introduction

New ideas in science and technology are the lifeblood of a research organization. The need to foster growth, innovation and diversification of products, technology platforms, and entire business units to maintain competitive advantage is increasingly important for

* Corresponding author. Tel.: +1 509 375 3646; fax: +1 509 372 6153.
E-mail addresses: ca.geffen@pnl.gov (C. Geffen), juddk@battelle.org (K. Judd).
[1] Tel.: +1 206 528 3330; fax: +1 206 528 3552.
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companies. It is equally important for publicly funded research institutions, with a responsibility to advance fundamental scientific discovery and to find ways to utilize those discoveries to address major national challenges. The accelerating pace of change in science and technology today and the emergence of breakthroughs at the interface of various disciplines have resulted in new attention to the process of identifying and developing ideas that ultimately lead to new scientific capabilities and business opportunities for an organization.

Much of the current research in technology innovation is focused on the efficiency of moving ideas from research to the commercial marketplace. Conceptualizing new products or technology platforms and linking them to potential markets are important aspects of successful innovation. An equally important element, however, and one that is not well understood, is how companies identify and foster the development of new focus areas for scientific research or technology development. This early stage of idea generation, before a product concept has evolved, has been called the ''fuzzy front end'' of innovation.[1]

Successful organizations are always generating new ideas—getting those ideas translated into program concepts that can be supported and funded by management, however, remains a challenge. The art of idea generation and development requires a supportive environment and a culture of discovery and innovation. Companies such as 3M are well known for their approach to encouraging research staff to explore new ideas. National laboratories in the U.S. also have a strong tradition of individual scientists developing new ideas for the next stage of their research or to explore a specific scientific question. Yet, the process of developing new organizational capabilities and major research programs that transcend individual interests remains a challenge. Understanding how best to evaluate and choose the directions for investment in new ideas, and then finding effective ways to accelerate the path to results is a challenge shared by public and private research organizations alike.

1.1. The importance of publicly funded science

The federal government has traditionally had a strong role in the U.S. research enterprise, providing at times as much as 67% of the total R&D funding for the nation (National Science Board, 2000).[2] As the nation's investment in R&D has grown over the last decades, however, industry has played an increasingly important role. According to the most recent publication from the National Science Board (2000), most of the R&D performed in the U.S. is currently paid for by private industry, which provided over 65% of the total R&D funding in 1998 (almost $150 billion). This support is provided during a time when the total level of R&D expenditures in the U.S. has been increasing since 1994 at a rate of almost 6% real growth per year. The role of industry in funding R&D is now greater than that of the U.S. government and is projected to remain so in the coming years. The federal government remains the major

[1] The term first appeared in an article by D.G. Reinersten, called ''Blitzkrieg product development: cut development time in half,'' *Electronic Business*, January 15, 1985.

[2] The government share of R&D funding was 67% in 1964—it has been on a slow decline, on a percentage basis, ever since according to the National Science Board.

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