

Absorptive Capacity: A New Perspective on Learning and Innovation

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In this paper, we argue that the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends is critical to its innovative capabilities. We label this capability a firm's absorptive capacity and suggest that it is largely a function of the firm's level of prior related knowledge. The discussion focuses first on the cognitive basis for an individual's absorptive capacity including, in particular, prior related knowledge and diversity of background. We then characterize the factors that influence absorptive capacity at the organizational level, how an organization's absorptive capacity differs from that of its individual members, and the role of diversity of expertise within an organization. We argue that the development of absorptive capacity, and, in turn, innovative performance are history- or path-dependent and argue how lack of investment in an area of expertise early on may foreclose the future development of a technical capability in that area. We formulate a model of firm investment in research and development (R&D), in which R&D contributes to a firm's absorptive capacity, and test predictions relating a firm's investment in R&D to the knowledge underlying technical change within an industry. Discussion focuses on the implications of absorptive capacity for the analysis of other related innovative activities, including basic research, the adoption and diffusion of innovations, and decisions to participate in cooperative R&D ventures.*

INTRODUCTION

Outside sources of knowledge are often critical to the innovation process, whatever the organizational level at which the innovating unit is defined. While the example of Japan illustrates the point saliently at the national level (e.g., Westney and Sakakibara, 1986; Mansfield, 1988; Rosenberg and Steinmueller, 1988), it is also true of entire industries, as pointed out by Brock (1975) in the case of computers and by Peck (1962) in the case of aluminum. At the organizational level, March and Simon (1958: 188) suggested most innovations result from borrowing rather than invention. This observation is supported by extensive research on the sources of innovation (e.g., Mueller, 1962; Hamberg, 1963; Myers and Marquis, 1969; Johnston and Gibbons, 1975; von Hippel, 1988). Finally, the importance to innovative performance of information originating from other internal units in the firm, outside the formal innovating unit (i.e., the R&D lab), such as marketing and manufacturing, is well understood (e.g., Mansfield, 1968).

The ability to exploit external knowledge is thus a critical component of innovative capabilities. We argue that the ability to evaluate and utilize outside knowledge is largely a function of the level of prior related knowledge. At the most elemental level, this prior knowledge includes basic skills or even a shared language but may also include knowledge of the most recent scientific or technological developments in a given field. Thus, prior related knowledge confers an ability to recognize the value of new information, assimilate it, and apply it to commercial ends. These abilities collectively constitute what we call a firm's "absorptive capacity."

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