Technology manager’s absorptive capacity of external knowledge

The capability of a technology manager to capture knowledge from outside the firm is a critical element of a firm’s innovation capability. However, former research has tended to overlook the roles that technology managers play in identifying, assimilating, and utilizing external knowledge. By examining absorptive capacity at the individual level, we seek to enrich the understanding of how technology managers learn from their external technological and market environment and how such efforts are linked to the technology strategy in their fields.

Technology manager’s absorptive capacity as a critical element of a firm’s innovation capability

As competition intensifies and the pace of change accelerates, firms are increasingly compelled to renew themselves by exploring and exploiting potentially valuable external knowledge for innovation (Jansen et al., 2006; Floyd & Lane, 2000; March, 1991). External knowledge provides greater prospects for the combination and recombination of knowledge in order to innovate (Leiponen & Helfat, 2010; Laursen & Salter, 2006; Fleming & Sorensen, 2004; Rosenkopf & Nerkar, 2001). In Cohen & Levinthal’s (1990) seminal paper on absorptive capacity, individual R&D managers were seen to be at the frontlines of allowing organizations to learn from external sources of knowledge. Fundamentally, the absorptive capacity of a firm depends on the ability of its members to recognize valuable external knowledge in the environment, align it with existing organizational capabilities and promote its utilization within the organization. Staying close to the original logic of this concept, individual-level absorptive is defined as “the level of effort that individuals undertake to identify external knowledge, assimilate it and utilize it to commercial ends” (ter Wal et al., 2011, p. 4).

However, many firms still rely predominantly on internal sources of knowledge, as transferring knowledge within the organization remains much easier than transferring it across organizational boundaries (Kogut & Zander, 1992). Hence, R&D managers are finding themselves under pressure to not only act as ‘technological gatekeepers’ (Allen, 1977) but also as carriers of external ideas into and across the firm (Mowery, 2009) – that is, technology managers.

Moving from technological gatekeepers to technology managers

Our current image of R&D managers’ role is tied to concepts of technological gatekeepers. Technological gatekeepers act as funnels of information from external to internal sources. However, this concept does not offer a complete picture on how individuals reshape and champion external knowledge to ensure its absorption by the wider organization. In a review of the literature on absorptive capacity, Volberda et al. (2010) come to the conclusion that research has overlooked the role that individuals play in absorbing external knowledge. In other words, the understanding of how technology managers should identify, assimilate and utilize external knowledge to facilitate innovation remains incomplete. Current challenges to technology managers are:

- Identifying useful external knowledge is costly in terms of resources to keep track of changing technological opportunities and market demands (Cockburn & Henderson, 1998; Katila & Ahuja, 2002; Laursen & Salter, 2006)
- Assimilating new external knowledge to existing knowledge is exacerbated, as it entails cognitive distance (Nootbooom et al., 2007) and does not align with existing organizational categories (Lane & Lubatkin, 1998)
- Utilizing an external idea internally is particularly difficult as a result of the Not-Invented-Here (NIH) syndrome (Katz & Allen, 2007)

Figure 1 represents the different process stages of individual-level absorptive capacity. Even more, technology strategy is influencing the degree of excellence in which these capabilities are crucial for the individual company.
Technology strategies

We assume that the quality of those capabilities is strongly related to the company's technology strategy. Fundamentally, a firm's technology strategy includes the basic decision which technological knowledge to incorporate into a firm's technology portfolio (Porter, 1985; Ford, 1988). Following previous literature, we distinguish between exploratory and exploitative technology strategies, which can be classified along two domains: (1) the proximity to existing technologies, products, and services, and (2) the proximity to existing customer or market segments (Jansen et al., 2006; Benner & Tushman, 2003; Danneels, 2002; Abernathy & Clark, 1985). Accordingly, exploratory technology strategies comprise the development of radical innovations which require new technological knowledge, thereby departing from a firm's existing knowledge base. Conversely, exploitative technology strategies include the development of incremental innovations which build on related technological knowledge, thereby broadening a firm's existing knowledge base.

Linking technology strategy and individual-level absorptive capacity

Raisch et al. (2009) note that explaining why some managers are better prepared to adapt to the level of exploration and/or exploitation activities in their technological fields may depend on the individual-level absorptive capacity. In a similar vein, Nooteboom et al. (2007) assume a differential effect of a firm's technology strategy on absorptive capacity depending on the strategy's extent of exploration versus exploitation. From the viewpoint of cognitive distance between knowledge sources, in exploration the role of absorptive capacity is supposed to be different than in exploitation (Nooteboom et al., 2007).

More specifically, exploratory technology strategies deal with searching for new, technological knowledge at a higher cognitive distance. Thus, we argue that this requires individuals to strengthen their capabilities to identify external knowledge, assimilate it and utilize it to commercial ends. By contrast, given the characteristics of exploitative technology strategies, with their focus on contextually localized search, we do not expect that individual-level absorptive capacity is as important as in exploration. In exploitation, absorptive capacity may be built up of more experience-based, tacit knowledge that already resides within the firm and within relations with trusted suppliers and customers.

In conclusion, it is important for technology managers to understand the importance and execution of searching for new, technology based business opportunities. Moreover, technology managers need to be aware that employing exploratory technology strategies, driven by the goal to benefit from distant search, comes at a risk of decreasing efficiency of search activities (Nooteboom et al., 2007). To deal with this, technology managers need to improve their capabilities to effectively locate and capture novelty value in their technological environment when moving beyond local search.

Technology manager survey

To empirically examine how technology managers learn from their external technological environment and how such efforts are linked to the technology strategy in their fields, we conduct a large-scale survey of R&D scientists and engineers across different industries (for participation see below).
Excellence in Open Innovation

**Technology managers**

**Identification**
- Stay up-to-date on market developments
- Monitor the global environment and keep track of emerging trends and new developments
- Become aware of external technological opportunities
- Aggressively seek out new opportunities through interaction with others
- Define new search fields to address changes in the company’s local and global environment

**Assimilation**
- Process external knowledge to get a sense of its value
- Evaluate external knowledge against business needs
- Excite peers about external knowledge
- Recombine external knowledge with internal knowledge
- Make external knowledge intelligible into a form understandable to colleagues
- Internally communicate, share and transmit external knowledge

**Utilization**
- Overcome internal resistance to guarantee the external idea is brought to fruition
- Show strong commitment, effort and persistence to utilize external knowledge
- Take risks to pursue adoption and capitalization of external knowledge
- Gain support and buy-in from management
- Take action to make sure potential of external knowledge is realized

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**Participation invitation – Are you working as a technology manager?**

Find out how to effectively learn from external knowledge within your technological field!

Your study participation: [www.zu.de/tm-survey](http://www.zu.de/tm-survey)

| Receive an benefit from an individual self-assessment and |
| an exclusive final report with all research results. |

The survey takes about 15 minutes. All data collected is used for academic research only and we guarantee the confidential treatment of your data. Please do not hesitate to contact Sebastian Heil (sebastian.heil@zu.de) in case of any questions.

Thank you in advance for your participation.

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**Further readings**


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**Your contact person for individual-level absorptive capacity**

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