Chapter 14
Learning, Using, and Retaining Deep Domain Expertise:
Working in Smart R&D Organizations

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ABSTRACT

New product development is a knowledge intensive undertaking. It involves creative exploration, skilled task execution and complex problem solving. For such activities to be effective, relevant domain expertise is required. Knowledge and expertise are not the same. Expertise is not the expert's knowledge, but the superior ability to put acquired knowledge and experience to work in a professional domain. Knowledge can be transferred, but expertise has to be learned. Organizations need to be aware of the difference when making deliberate efforts to maximize the operational value of their knowledge and expertise. This chapter explains the nature of domain expertise, how it is acquired and its crucial role in new product development.

INTRODUCTION

The long term success of businesses to a large extent relies on product and service innovation and the development of professional expertise in related areas. Over a long period of time a great deal of expertise has been gained in many important business, technology and management disciplines.

New Product Development (NPD) is a complex, high value undertaking with both uncertainty and risk involved. Expertise is obviously an important enterprise asset that needs to be engaged and brought to bear on key product and technology issues. Experts and master practitioners thus play important roles in high-performing technology firms. At the same time, managing creativity, learning and expertise has remained a challenge also to organizations which have adopted traditional Knowledge Management (KM) practices. Many have continued to experience less than expected returns on their knowledge assets. Valuable as it is, like tacit knowledge, expertise is also intangible and volatile.

With a proper understanding of expertise and expert behaviour, NPD organizations will be better equipped to make deliberate use of their expert resources. Conversely, with insufficient or less utilized expertise, organizations may be under-performing in key disciplines and ultimately fail to deliver on their mandates. As knowledge and expertise are different in nature, organizations need to go beyond traditional knowledge management practices and find ways to also learn, use and retain deep domain expertise.

BACKGROUND

The organizational performance of an enterprise is determined both by the maturity of its practices and by the expertise of its workforce. Organizational maturity is demonstrated by the scope and consistency of both work and management practices and their impacts on enterprise mission delivery. The development of expertise depends on more than just acquiring experience. Reaching a level of expert performance requires *deliberate practice*, i.e. a practice involving self-regulated learning and improvement (Ericsson, 2006). Characteristics of deep expertise include speed of decision making, superior context awareness, extrapolation & discrimination ability, pattern recognition and a high degree of tacit knowledge (Leonard & Swap, 2005).

The management of R&D organizations faces the same general challenges as those experienced in most other types of enterprises. There are, however, some important characteristics of R&D operations. One is the need to accommodate both improvements to existing product lines and the turning of emergent technologies into new high value products and services. Another is the need to maintain a high throughput in the new product development process, while at the same time make sufficient room for individual and organizational learning. Work teams are important learning environments. In e.g. agile development projects, team members grow their expertise more by acts of knowing or "knowing in practice" than by knowledge codification and transfers (Choo, 2014).

New product development projects can be executed in a wide range of environments including start up ventures, small to medium enterprises and large multi-national firms. The organization of work increasingly involves various levels of cooperation and collaboration internally or across firm boundaries. Typically, large NPD organizations are product focused, process driven and project centered. These different operating environments have their specific circumstances and challenges. What they have in common is that organizational performance to a large extent depends on the level of professional expertise in specific technology and management disciplines. In addition, key organization and management issues include access to experts and the development of expertise by non-expert practitioners (O'Dell & Trees, 2014). In multi-project environments, there is an increased need for experts to engage in mentoring and coaching activities and take responsibility for the stewarding of knowledge (Miranda, 2003). Expertise is both knowledge and thinking skills. Learning through mentoring therefore involves protégés and experts developing a practice of thinking "aloud" about a problem or situation and making considerations and judgments visible (McDermott, 2012).

Today most NPD organizations have adopted standard practices. These typically involve handling explicit customer requirements, preparing design specifications and using a stage gate model to manage individual product development projects. Despite its considerable merits, this approach does not quite guarantee a superior organizational performance in the long run. Rapid market and emerging technol-

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