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Divergent thinking and market visioning competence: An early front-end radical innovation success typology

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ABSTRACT

Achieving superior and longer-term rewards associated with the pursuit of radical innovation requires that firms have a market vision (MV), or a clear and specific image of a desired and important product-market for a new technology, and are able to attract human and investment capital (AAC) in order to carry out and finance these risky ventures. To achieve these outcomes, firms need to build a market visioning competence (MVC)—that is, an ability to link advanced technologies to market opportunities of the future. Developing an MVC entails the efforts of both the individuals who are part of the innovation process and the organization itself. Four components comprise the MVC equation: the individual-level capabilities of "networking" and "idea-driving," and the organization-level capabilities of "market learning tools" and "proactive market orientation." In this article, we focus on the conditions within the firm that need to be created and fostered to ensure an effective MVC. The antecedents of interest involve the capacity for divergent thinking—that is, the ability to go beyond the boundaries of established thought—and include four individual- and two organization-level constructs. Individual divergent thinking skills include (1) attitude of openness to new ideas; (2) ability to create, combine and help others to generate new ideas; (3) ability to move efficiently from divergent to convergent thinking; and (4) a passion for cognitive challenges. Two organization-level antecedents include: an innovation culture of (5) encouragement of idea freedom and (6) encouragement of diversity. Based on a survey of 198 high-tech firms in the North American nanotechnology sector, cluster analysis was used to develop a typology of scenarios that provides a holistic view of what distinguishes firms in terms of MVC, their ability to create and manage individual- and organization-level divergent thinking approaches, as well as the outcomes of MV and AAC. Three distinct profiles emerge. The "balanced MVC profile" rates high on all factors—components, antecedents and outcomes—and provides a "model" for managers concerned with developing an effective MVC. Cluster #2, labeled "need MVC system/culture," while having the most important element in place—the individuals who think in dynamic ways and connect firms with totally new opportunities—require both market learning systems and a more proactive market orientation, and in particular, an organization culture where management encourages divergent thinking. Cluster #3 ("lack MVC basics") firms have invested in MVC-related infrastructure, but this provides an anemic context when the key elements of individual innovativeness in terms of the ability to think in radically new ways and an organization culture that encourages this are lacking. Based on the MVC concepts, relationships discussed and the empirical evidence, this article offers insights for researchers in terms of theory and scale development, and for managers charged with radical innovation in terms of the actions needed to enhance MVC and, ultimately, NPD performance.

1. Introduction

As markets and industries have matured and become increasingly commoditized, and as board direction focuses management increasingly on meeting bank ratios and "lean development" (Oosterwal, 2010), companies that are open to developing and marketing truly innovative, new-to-the-world, products have become increasingly rare. Recent studies (e.g., Adams & Boike, 2004; Cooper, 2011) show that since the 1990s, organizations have tended to concentrate new product development (NPD) largely on product modifications or additions to existing lines, while substantially reducing commitment to radically innovative, new-to-the-world products. This has resulted in new product portfolios that are highly skewed to incremental enhancements. While this change in focus often makes quick and easy returns for companies possible, it has drastically reduced (by close to 50%; Cooper, 2011) development projects that involve radical innovation. Although radical

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innovation involves higher risk, particularly if the right resources and culture are not in place to reduce such risk, involvement in this type of innovation is important as it carries the potential for the much greater rewards of longer-term market advantage and superior levels of profitability (Kleinschmidt & Cooper, 1991; Veryzer, 1998). What is of particular concern is that this has created a majority of companies with managements and NPD teams that have little experience in dealing with the types of uncertainties surrounding discontinuous technologies in being really creative, and in stretching thinking in unconventional, unimpeded or even unorthodox ways. In the radical innovation context, essential for achieving success is the creation very early in the NPD process of "a clear and specific mental model or image… of a desired and important product-market for a new advanced technology"—that is, a *market vision* (MV)—on which to base new product decisions (Reid & de Brentani, 2010, p. 500). And, the key to creating such a vision is the capability of individuals in the organization to successfully link advanced technologies to market opportunities of the future (Colarelli O'Connor & Veryzer, 2001). In other words, the capability set involved in having an "effective" *market visioning competence* (MVC) enables this linking process of technology to future market potential to occur. Previous research (Reid & de Brentani, 2010) has demonstrated that companies able to project into the future in this way are more successful in establishing a clear, credible and compelling market vision involving radical innovation that results in early success through gaining acceptance of their ideas and thereby attracting the capital (i.e., human, investment and technological) so critical for undertaking focused development of specific advanced technologies.

In the early stages of radical innovation, ideas for developing a technology for market application are multiple, highly diverse (Baer, 1993; Guilford, 1967) and may stem from a variety of sources and processes. Thus, in order to be successful with the divergent ideas that tend to prevail during this early stage of radical innovation, firms need to have a set of organizational skills and processes which can absorb, work with and be enabled by such ideas. In other words, the key to developing an effective market visioning competence in the case of radical innovation involves the ability to develop and nurture *divergent thinking* (Hudson, 1967; Meadow, Parnes, & Reese, 1959), which enables expansion of the boundaries around established points of view (e.g., current products and applications) and seeing things from many, often paradoxical, perspectives, and breaking existing frames of reference (Kuhn & Marsick, 2005). It is MVC and its divergent thinking antecedents that are the focus of this article. In particular, this research concentrates on high-tech companies involved in NPD at the radical end of the innovativeness spectrum. Based on the underlying capabilities that comprise MVC, we develop a holistic, multi-attribute, set of scenarios—that is, a typology of distinct MVC profiles. By incorporating, as part of the profile, company ratings of the antecedent divergent thinking skills and attitudes, as well as the outcomes of market vision (MV) and ability to attract capital (AAC), we gain insight about how and to what extent companies involved in radical innovation differ in achieving an effective MVC. Fig. 1, which provides a schematic representation of the relationships studied (Reid & de Brentani, 2010), shows that MVC (the ability of individuals in organizations to link advanced technologies to market opportunities of the future) significantly impacts both MV (a clear and specific model or image that organizational members have of a desired and important product-market for a new technology) and early performance (the ability of the firm to attract capital for the venture; AAC). MV is a second-order factor consisting of five first-order constructs (clarity, magnetism, specificity, form and scope), and AAC is a first-order construct comprising three items (growth in employment due to involvement with the technology, early cash flow and ability to attract capital). The reliability and validity of these factors were established in Reid and de Brentani (2010). The present research makes three contributions (1) it provides much-needed theory for understanding the divergent thinking antecedents of MVC; (2) it develops a typology of MVC profiles relevant for companies involved in a high-tech radical innovation context; and (3) it offers insights for managers about divergent thinking—that is, the skills, conditions for and approaches to innovative thought—and therefore what is needed for ensuring an effective MVC, as well as ideas about how best to foster these in firms involved in radical innovation.

2. Theoretical context

2.1. What is market visioning competence?

Market visioning competence (MVC) represents a set of capabilities by which firms achieve a competitive advantage through the development of radical new products (Reid & de Brentani, 2010). Housed in the resource-based dynamic capabilities framework of Teece, Pisano, and Shuen (1997), market visioning competence is seen as a reflection of the overall exploratory learning skill-set, or capabilities, of the firm at both the individual and the organization level. In a radical innovation context, these offer the firm the opportunity to achieve superior performance outcomes (Wernerfelt, 1984) such as developing a potentially successful product-market option (MV) and a heightened ability to attract capital. In other words, MVC as a competence entails critical learning process capabilities that enable the movement of information and ideas, as related to developing a market vision for a new product. In effect, the process of visioning helps to answer the key question of which market applications to pursue and offers the route, through attraction of capital, to enable pursuing these. Thus, MVC represents a crucial resource allowing firms in dynamic business scenarios, such as those provided by radical innovation, to build further capabilities and resources that provide defensible competitive advantages that can be turned into profits (Grant, 1991). The capabilities comprising MVC are identified and validated in Reid and de Brentani (2010) in terms of four underlying constructs comprising two factor groups. These include individual-level capabilities of *networking* and *idea driving*, and organization-level capabilities of *market learning tools* and *proactive market orientation*. These components, which are symbiotically linked, are presented in Exhibit 1 and discussed below.

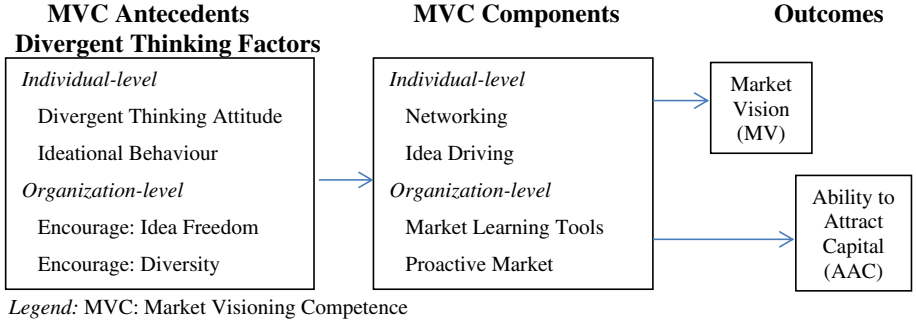

Fig. 1. Model of market visioning competence: components, antecedents and outcomes. *Legend:* MVC: market visioning competence. (For interpretation of the references to colour in this figure, the reader is referred to the web version of this article.)