The Dynamic Balance between Explorative and Exploitative Learning under Open Innovation

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Abstract The ability to learn has been considered as a critical source of competitive advantage in the 21st century. Based on the March’s study, this paper analyzes the explorative learning and exploitative learning under open innovation, extends March’s perspective of the balance between explorative and exploitative learning, and develops a dynamic balance model of these two paradigms of learning.

Key Words explorative learning, exploitative learning, dynamic balance, open innovation, learning economy

1 Introduction: Learning Economy and Open Innovation

As the 21st century dawns, the ongoing growth of economic complexity, variety and specialization, business environments are being transformed by a number of factors including increasing globalization, technological development, the increasingly rapid diffusion of new technology and knowledge revolution [1]. An entirely new competitive situation which D’Aveni named “hyper-competition” has arisen [2]. In such a hyper-competitive environment, the keys to firms’ success have changed dramatically. The ability to learn and to generate and share ideas and knowledge has been considered, from a strategic perspective, as a critical source of competitive advantage [3][4][5]. Learning economy, which is not only connected to the flow of objects from the “stock of knowledge”, but also the generation of new knowledge, particularly through innovation [6], has emerged. In order to keep a sustainable competitive advantage in the increasingly fast-paced economy, firms and organizations must acquire, create, diffuse and use new information and sources of knowledge quickly and effectively.

The ever increasing importance of knowledge and learning in contemporary society calls for a shift in our thinking concerning innovation. The traditional innovation paradigm, which Chesbrough named closed innovation [7], means successful innovation requires control. Firms must “generate their own ideas and then develop them, build them, market them, distribute them, finance them, and support them on their own (Chesbrough, p. xxi)”. The changed business environments and the arrived learning economy erode the underpinning of closed innovation. Innovators is shifting from its traditional inward focus to more outward-looking management — open innovation which assumes that “firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology (p.xxviii)”. In order to increase the return on their R&D and innovation, firms complement their in-house R&D with external technologies, and offer up their own technologies to outsiders [7]. Open innovation is concerned to be an effective innovation paradigm in learning economy.

2 Explorative Learning and Exploitative Learning

Under the learning economy and open innovation, firms – even the largest and technologically leading ones – must complement their in-house R&D with external technologies, must explore and learn new ways while concurrently exploiting what they have already learned. It is March who first distinct exploitative and explorative learning. Exploitation includes refinement, choice, production, efficiency, selection, implementation, execution. Exploration includes search, variation, risk taking, experimentation, play, flexibility, discovery, innovation. Therefore, exploitative learning is refinement and deepening existing technologies, whereas explorative learning is experimentation with new alternatives [8]. Explorative learning implies that the firm departs from its existing technology base and the knowledge involved is both tacit and novel to the firm, while exploitative learning is likely not be tacit and entails less uncertainty because the firm is experienced and has much of the required knowledge in-house [9].

Though there are marked differences between exploitative and explorative learning, the strategy for
learning should not be either exploration or exploitation as a stand-alone strategy in the knowledge acquisition process. Firms that engage exclusively in exploration often suffer from high experimentation costs; it leads to undeveloped ideas and competencies. Firms that engage exclusively in exploitation often suffer technological inertia. So, firms should maintain a balance between exploration and exploitation [8][9][10][11][12]. Through exploitive learning, firms can develop their existing technology for meeting their customers’ needs in the current market and keeping their competitiveness in the near term; while with explorative learning, firms would construct their technical capability of novel technology and expand their business to new market in order to build sustainable completeness for the long term.

Though some studies of organizational learning have acknowledged that exploitative and explorative learning are related and need to be balanced, little effort has been devoted, however, to explaining the mechanism of this balance. It is considered that the balance between these two learning is spontaneous, passive; and exploitative and explorative learning are competed each other. For example, Holmqvist [13] suggested, predominantly exploitative organization may contribute to exploration, or vice versa. The fundamental mechanism of such transformations is “the emanation of queries that are generated by a sense of dissatisfaction with prevailing exploitative or explorative rules (p. 71)”. And in the Crossan’s study [10], the word “balance” is substituted by the term “tension”. As Crossan suggested, both exploitation and exploration are essential for organizations, but they compete for scarce resources and “this competition for resource creates a tension (p.524)”.

3 The Dynamic Balance between Explorative and Exploitative Learning under the Open Innovation

In open innovation, it is of significant importance for firms to balance both types of learning in order to stay competitive in the short and the long run. But the balance of explorative and exploitative learning isn’t static, spontaneous and passive, nor is it competitive. Under the open innovation, the balance between explorative and exploitative learning is a dynamic balance (figure 1).

![Figure 1 The dynamic balance of explorative and exploitative learning: from one technology](image)

From the figure 1, we know that the frequency of exploitative learning and explorative learning are variable along the time, there isn’t a static proportion and balance of these two learning. From the view of a new technology, in the beginning phase when the technology is distant from the existing knowledge base of the firm, firm needs much more exploration, such as search, experimentation, and discovery. But it doesn’t mean there are no exploitative activities. Organizational learning, both explorative learning and exploitative learning, must base on firm’s prior related knowledge and background which construct the firm’s absorptive capacity to recognize the value of new, external knowledge, assimilate it and apply it [14]. That is, there’s exploitative learning during explorative learning. In the later stage of explorative learning, firm has accumulate much knowledge and information about the technology, and firm may involve much more exploitative activities such as refinement and deepening the existing technology in order to obtain much more benefit from the existing technology and knowledge. But effective exploration of existing technology and knowledge must integrate the complemenal knowledge elements. That is, through exploring the complemenal knowledge, firm can exploit existing knowledge and generate new ideas which would inspire to exploit internal knowledge in the future [15]. In conclusion,
there is a dynamic balance between explorative learning and exploitative learning during the different stage of organizational learning. The exploration of comparatively new knowledge and the exploitation of existing knowledge are co-evolution and interact, which would help firms to refine and deepen their existing technology for meeting their customers’ needs in the current market and keeping their competitiveness in the near term and expand their business to new market to build sustainable completeness for the long term (figure 2).

From the long term, there are several such balances which facilitate the technological progress and innovation capability’s building up (figure 3).

4 Conclusion
Due to the differences in exploration and exploitation activities, many firms tend to optimize exploitation [12]. Especially in stable environments, where technology and behavior paradigm rarely become obsolete, firms may be little interest in explorative learning. But in changing or unstable environments, firms face the challenge of exploring new alternatives, redeploying their existing resources and developing new capabilities and technologies. In order to keep sustainable competitiveness, firms need to balance explorative learning and exploitative learning dynamically.

References


