

The Net-Enabled Business Innovation Cycle and the Evolution of Dynamic Capabilities

Shaker A. Zahra • Gerard George

Department of Management & Electronic Commerce Institute, J. Mack Robinson College of Business, Georgia State University, Atlanta, Georgia 30303

Weinert Center for Entrepreneurship, Department of Management & Human Resources, University of Wisconsin-Madison, 5252 Grainger Hall, 975 University Avenue, Madison, Wisconsin 53706

szahra@gsu.edu • ggeorge@bus.wisc.edu

Wheeler's Net-Enabled Business Innovation Cycle (NEBIC) integrates IS and strategy research to offer an interesting and timely perspective on value creation. We extend Wheeler's theoretical propositions, highlighting the interplay between strategy, IS, and entrepreneurship in a quest for competitive advantage. This interplay is crucial to the creation of the dynamic capabilities that enable companies to gain an advantage through NEBIC. The importance of opportunity recognition and absorptive capacity in bringing about the changes that make NEBIC viable is also highlighted.

(Absorptive Capacity; Capabilities; Innovation)

Net-enabled organizations are likely to be more agile and capable of competing in dynamic markets than other organizational forms (Straub and Watson 2001). Wheeler (2000) extends this concept through his theory, the net-enabled business innovation cycle (NEBIC). This theory integrates the research of strategy and IS by addressing ways in which emerging IT can influence a firm's ability to achieve growth and to create and sustain a competitive advantage. This is a substantive contribution to a growing literature that links IT and strategy in an effort to develop viable new business models that define the rules of competitive rivalry in cyberspace (Weill and Vitale 2001).

The present article builds upon and extends Wheeler's work by providing a strategic entrepreneurship perspective to his NEBIC theory. This view integrates entrepreneurial (i.e., opportunity-seeking behavior) and strategic (i.e., advantage seeking) perspectives in mapping actions designed to create wealth (Hitt et al. 2001, 481). This integration is especially suited for analyses of NEBIC where emphasis centers on identification of new opportunities and moving

quickly to exploit them in ways that create value and wealth.

We have two primary objectives in this article. First, we elaborate upon the uniqueness and strength of Wheeler's premise that IT strategy may *precede or drive* business strategy formulation. Our discussion will highlight the challenges and rewards of allowing IT to shape the firm's strategic agenda and define the essence of NEBIC. Second, we discuss ways to integrate strategic management theory and models to enrich the IT literature. By applying the dynamic capabilities view, we hope to show how the integration of this perspective with NEBIC may provide a new lens for IS research.

NEBIC and Opportunity Recognition

The central proposition of NEBIC theory is that net-enablement moves IT to the forefront so that it precedes or drives business-level strategy formulation. While we agree that IT may create new opportunities for a firm by creating new markets or by generating

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new value propositions, extant strategy and entrepreneurship research provides both conflicting and complementary insights.

Strategy research stresses the importance of path dependence in organizational learning that influences a firm's decision to enter new markets or to provide new services. This path dependence often influences the firm's locus of search for new technologies (Rosenkopf and Nerkar 2001). Firms search in places where they have had success in the past or are familiar with the history or development of emerging technologies. When new technologies suddenly emerge, firms are blindsided and are unable to change with commensurate speed (Christensen 1997). This argument suggests a paradox within the NEBIC theory. NEBIC may provide a useful theory base to suggest an appropriate firm behavior, but may not be as effective if a firm's locus of search is constrained within existing knowledge bases with which they are familiar. Many firms are unlikely to be aware of emerging technologies or their impact on the firm's business strategy. Entrepreneurship researchers have highlighted the importance of organizational and individual alertness and the search for new ideas as being crucial to identifying and exploiting such innovative technologies (Kirzner 1979).

Wheeler's cycles of "choosing enabling technologies" and "matching with economic opportunities" underscore the centrality of opportunity recognition and entrepreneurial behavior within these organizations. A firm's ability to recognize and identify new market spaces, determine their potential strategic importance, visualize their evolution, and match them with emerging technological capabilities are central tenets for surviving in dynamic markets.

Clearly, with its assumption that net-enabled firms are entrepreneurial and can recognize and capitalize upon emerging opportunities, NEBIC theory offers new insights. Future empirical work on NEBIC theory needs to incorporate measures that capture a firm's entrepreneurial propensity to constantly revisit their business model and value propositions based on emerging new technologies. The IT literature would also benefit from historical and interpretive analyses of events based on technology emergence, firm choices, and effects on innovative output and value

creation. In a similar vein, strategy and entrepreneurship researchers can create mutually helpful insights by examining the emergence and adoption of net-enabled organizations, the distinctive characteristics that give them a source of competitive advantage over other types of organizations, and the factors that influence value creation within these firms.

Dynamic Capabilities and NEBIC

One area where management and IS researchers can work together is in applying dynamic capabilities theory (Teece et al. 1997). This theory affords the IT field an opportunity to frame its research questions based on situational and environmental contexts within which such technologies can enable a firm to gain and sustain a competitive advantage. It suggests that dynamic capabilities are essentially change-oriented capabilities that help firms redeploy and reconfigure their resource base to meet evolving customer demands and competitor strategies. NEBIC theory addresses such change-orientation and builds on the dynamic capabilities view.

But there is some creative tension in the argument that dynamic capabilities, per se, would not allow firms to sustain a competitive advantage (Eisenhardt and Martin 2000). The assumption is that path dependency in the adoption of strategies and technologies that allow firms to differentiate themselves and deliver customer value in the short run can be imitated and substituted in the long run, thereby eroding the firm's ability to sustain supra-normal profits from such IT-related strategies. However, other researchers believe that the ability to foresee technological change and adopt the appropriate strategies may, in fact, create a trajectory of growth that would create and sustain a competitive advantage (Cockburn et al. 2000). Both the timing and cost of the change-oriented strategy would influence a firm's ability to create and sustain a competitive advantage.

Future empirical testing of the NEBIC theory and the dynamic capabilities view could enrich the IT field in several ways. NEBIC theory focuses on delivering customer value through firm generated "value propositions." The dynamic capabilities view considers firm performance to be an outcome measure. Even though

customer value may lead to performance-oriented payoffs, empirical testing of this is unlikely to be captured easily, given the difficulty of connecting specific value propositions to incremental changes in firm performance. Therefore, we suggest that future researchers incorporate metrics that capture intermediate cost savings or reductions in cost structure attributed to net-enabled strategic change. The timing of such strategies and the time taken to complete the NEBIC cycle are additional metrics that connect NEBIC and the dynamic capabilities perspectives.

IT and strategy researchers would benefit from recognizing the entrepreneurial dimension of building and maintaining dynamic capabilities. This process requires some foresight, creativity in envisioning the emerging cyberspace, identification of emerging boundaries of the new competitive arena, and promoting organizational innovation that bring the NEBIC concept to life. Viewed from this perspective, NEBIC theory becomes an important means of venturing into new competitive arenas, enabling a firm to transform its business concept and competitive strategy. As such, NEBIC helps to foster an effective dialog between the firm's technological resources, competencies, and strategic objectives. Thus, while we agree with Wheeler that emerging IT represents the leading edge of business innovation, we believe that organizational innovation is the key to value creation. How the organization is set up, managed, and integrated can influence the outcomes of NEBIC. IS literature is likely to benefit by studying these issues closely.

Absorptive Capacity, Organizational Innovation, and Change

Rogers' (1962) model on the diffusion of innovation has dominated thinking about companies' adoption of digital business models. Wheeler builds on the assimilation and adoption processes suggested by this model to argue that they may be constrained by a firm's absorptive capacity (Cohen and Levinthal 1990). Some recent work develops the absorptive capacity construct as a change-oriented dynamic capability (Zahra and George 2002), addressing Wheeler's concerns about net-enabled change in moderately dynamic markets. This work suggests that absorptive capacity consists of acquisition, assimilation, transformation, and exploitation capabilities. The argument is

made that routines and processes underlie each capability which, in combination, allow organizations to make changes that afford them much-needed strategic flexibility in dynamic markets. In our view, it is essential to capture these individual capabilities and relate them to NEBIC.

Another area of cooperation arises from overlaps in NEBIC theory that would benefit future IT and strategy research. First, the reconceptualization of absorptive capacity (Zahra and George 2002) as a dynamic capability—with four underlying organizational capabilities, each comprised of specific routines and tasks—allows researchers to isolate specific knowledge management processes and relate them to changes in IT. This view assumes that knowledge management is an IT-driven capability. Wheeler provides greater depth in understanding the specific routines and processes that underlie our assumptions on building absorptive capacity that enables organizational change. Both strategy and IT research would benefit from relating knowledge management processes with specific changes to technological capabilities. Second, absorptive capacity also has potential and realized components. Some firms may develop acquisition and assimilation capabilities (i.e., "potential capacity") but may be ineffective in transformation and exploitation capabilities (i.e., "realized capacity"). We term this difference as the firm's efficiency ratio. The IT literature provides similar insights into this phenomenon. For example, Fichman and Kemerer (1999) introduce the assimilation gap concept. They develop an operational measure derived from the difference between the acquisition and employment patterns in IT. Wheeler's article provides a similar insight in its variance perspective theory predictions, where it is suggested that if one of the four capabilities (choosing, matching, executing, and assessing) is low, customer value decreases. This striking convergence in management and IS research should encourage scholars to explore these capabilities and demonstrate how achieving adequate strength in each can lead to superior performance.

NEBIC theory builds on the premise that firms are able to adapt to technological changes induced by digital technologies, an assumption that is not universally

true (Christensen 1997). Established firms have to invest heavily to build the absorptive capacities needed to exploit new IT technologies. Success in this process depends on the firm's reserves of relevant knowledge, managerial commitment to adopting the new technologies, and the entrepreneurial process that pervades the firm's operations. Some firms are adept at developing systems and processes that create and expand their absorptive capacities (Kim 1998). Both IS and strategy research should examine the processes that firms use to develop and renew their absorptive capacity.

Conclusion

Wheeler's NEBIC theory is a promising perspective on how organizations can benefit from digitally induced transformations. Our discussion shows the need to adopt a strategic entrepreneurship perspective in building, renewing, and exploiting firms' dynamic capabilities as our understanding of the rules of competition in cyberspace evolves. Entrepreneurship defines opportunities, where IT makes these opportunities feasible and viable. Strategy enables firms to differentiate themselves from their rivals to generate wealth. It is this ongoing interplay between entrepreneurship, IT and competitive strategy that makes the firm's capabilities dynamic, even as markets and competitors change. This interplay between entrepreneurship, IT and competitive strategy provides some insights into how value may be created in net-enabled organizations.

References

Christensen, C. 1997. *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail*. Harvard Business School Press, Cambridge, MA.

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- Cockburn, I., R. Henderson, S. Stern. 2000. Untangling the origins of competitive advantage. *Strategic Management J.* 21(10-11) 1123-1146.
- Cohen, W. M., D. A. Levinthal. 1990. Absorptive capacity: A new perspective on learning and innovation. *Admin. Sci. Quart.* 35 128-152.
- Eisenhardt, K., J. Martin. 2000. Dynamic capabilities: What are they? *Strategic Management J.* 21 1105-1122.
- Fichman, R., C. Kemerer. 1999. The illusory diffusion of innovation: An examination of assimilation gaps. *Inform. Systems Res.* 10(3) 255-275.
- Hitt, M. A., R. D. Ireland, S. M. Camp, D. L. Sexton. 2001. Strategic entrepreneurship: Entrepreneurial strategies for wealth creation. *Strategic Management J.* 22 479-491.
- Kim, L. 1998. Crisis construction and organizational learning: Capability building in catching-up at Hyundai Motor. *Organ. Sci.* 9 506-521.
- Kirzner, I. 1979. *Perception, Opportunity, and Profit*. University of Chicago Press, Chicago, IL.
- Rogers, E. M. 1962. *Diffusion of Innovations*. Free Press, New York.
- Rosenkopf, L., A. Nerkar. 2001. Beyond local search: Boundary spanning, exploration and impact in the optical disk industry. *Strategic Management J.* 22 287-306.
- Straub, D. W., R. T. Watson. 2001. Transformational issues in researching IS and net-enabled organizations. *Inform. Systems Res.* 12(4) 337-345.
- Teece, D. J., G. Pisano, A. Shuen. 1997. Dynamic capabilities and strategic management. *Strategic Management J.* 18 509-533.
- Weill, Peter, Michael Vitale. 2001. *From Place to Space: Migrating to eBusiness Models*. Harvard Business School Press, Cambridge, MA.
- Wheeler, B. 2002. The Net-enabled business innovation cycle: A dynamic capabilities theory for harnessing IT to create customer value. *Inform. Systems Res.* 13(2).
- Winter, S. 2000. The satisficing principle in capability learning. *Strategic Management J.* 21(10-11) 981-996.
- Zahra, S., G. George. 2002. Absorptive capacity: A review, reconceptualization, and extension. *Acad. Management Rev.* 27(2).