THE INTEGRATION OF INFORMATION TECHNOLOGY AND STRATEGIC FORCES: A FUNCTIONAL THEORY FOR INFORMATION SYSTEMS STRATEGY

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ABSTRACT

Porter's Five Forces model of business strategy is foundational to understanding strategic forces and the role of information technology in the larger strategic framework of an organization. We suggest that information technology potentially changes the strength and/or influence of the forces in Porter's model. Furthermore, understanding how specific technologies potentially change specific forces within Porter's model is the foundation of strategy for information technology. For example, if one understands that global networked systems like the internet lower the barriers to entry for new specialty retailers (changing the influence of barriers to entry from restrictive to accommodating), then one's business strategy as a new entrant into the industry must be supported by an information systems strategy that leverages the internet into competitive advantage over incumbents. Similarly, if one understands that upstream supply chains facilitated by computer networks increases the bargaining power of suppliers due to lock-in tactics, a supplier's information systems strategy should include adoption of technologies that enhance the relationship with the purchaser. This theoretical framework is developed through cases that demonstrate how specific technologies change the strategic forces within industries and how organizations such as Amazon, Dell, Microsoft, and Wal Mart take advantage of these changing forces.

INTRODUCTION

The foundation for much of the research in strategic information technology is the theory of strategic alignment developed by Henderson and Venkatramen (1989). Called the strategic alignment model (SAM), this theoretical foundation makes a distinction between externally-focused IT (IT strategy) and internally focused systems (IT infrastructure and processes). These two distinct foci necessitate the integration of IT with both business strategy and operations. It is this integration of IT with business strategy that results in strategic alignment and thus, by extension, competitive advantage. We believe this should be a planned process of the type recommended by Newkirk, Lederer and Srinivasan (2003) in contrast to the evolutionary process suggested by Peters, Heng, and Vet, (2002). Unfortunately, there is little agreement in the relevant literature about what, exactly, this strategic alignment is. Avison, Jones, Powel and Wilson (2004) stated this unequivocally in their discussion of the strategic alignment model:

> In contrast to some other areas of IS research, there is debate in the literature about what alignment actually is, why it is needed, how firms may go about the task of becoming aligned, and how it should best be researched (p. 224).

We propose that strategic alignment must be understood and implemented in terms of the impact of IT on the influence and strength of the forces in Porter's Five Forces Model (1979). This approach to strategic alignment will include a review of Porter's model, an analysis of the potential impacts of IT on strategic forces, examples of these impacts from current businesses and organizations, and suggestions for future research.

STRATEGIC TECHNOLOGY AND THE FIVE FORCES

The central part of our theory of strategic alignment is that technology, in order to be strategic, must alter the influence or strength of the forces within Porter's Five Forces model. Since this concept of strategic thinking considers a firm's position within an industry relative to the five forces, it follows that strategic technologies must influence one or more of these forces to the advantage of a firm. This approach is valuable in that it provides direction for which technologies to adopt, maintain, and support as strategic in order to achieve sustained competitive advantage. We believe there is a critical difference between strategic technologies and "leveling" technologies, which apply to all firms in an industry.

We must now examine how technology can influence these forces for strategic advantage, beginning with New Entrants. A technology that makes it easier for new firms to enter an industry obviously changes the competitive nature of that industry. Conversely, other technologies have increased the barriers to entry in some industries. Let's consider next the Bargaining Power of Suppliers. Any technology capable of increasing the number of suppliers will decrease the bargaining power of any single supplier. Furthermore, technologies that increase switching costs for customers increase the power of suppliers while those that decrease switching costs decrease the power of suppliers. The Bargaining Power of Buyers is influenced by a number of similar factors. As the number of buyers of aproduct or service increases, the bargaining power of any individual buyer decreases. On the downstream side, internet technology has increased the pool of potential buyers of many products and services thereby decreasing their power as individual buyers while increasing the power of the sellers. Substitute Products are increasing their importance as a strategic force as well. The networked economy, enabled by a broad range of telecommunications and transportation technologies, makes substitute products and services an increased threat to firms in many industries. This is particularly true as a larger portion of GDP becomes discretionary spending.

Finally, let's analyze the traditional force of Rivalry Among Existing Firms. In no other area does the distinction between leveling and strategic technology become more important and apparent. Within an industry, it is almost inevitable that rivals will use the same core technology for the production of their products and services. In most instances, these core technologies will be supplied by vendors of machine tools, computer and information technology, transportation equipment, and building infrastructure. These technologies, even those that are "disruptive" in nature (Bower and Christensen, 1995), transfer very rapidly among the rivals within an industry. As a result, most core technology within an industry is leveling, rather than strategic. For example, all the transportation companies use the same airplanes, locomotives, and trucks. Manufactures use the same milling machines, welding robots and conveyors. Banks use the same database systems to track customers and accounts as do insurance companies.

Even when a new application of a technology is introduced, the competitive advantage gained by a single firm is short-lived. While Fed Ex pioneered the package tracking system it was quickly duplicated by UPS and other parcel delivery companies. Core technologies, initially thought perhaps to be strategic, rapidly become leveling technologies as the technology transfers among rivals within an industry. Sustained competitive advantage among rivals derived from technology (i.e., strategic) usually occurs when the technology is maximized by innovative organization structures, marketing channels, or supplier relationships. Such competitive advantage may be gained through the development of proprietary technology that is kept proprietary or through the exploitation of advantages gained through one or another of Porter's Five Forces as illustrated above.

RICHNESS, REACH, AND AFFILIATION

In the information age, competitive advantage has shifted from control and expertise in mechanical processes to navigation of rich arrays of information (Toffler, 1980). Generally termed "electronic commerce," competition based on seizing the high ground of information superiority is the point at which competitive advantage is realized. According to Evans and Wurster (1997, 1999) strategy here is based primarily on the new economics of information rather than on the old economics of things. Prior to the proliferation of IT, the economics of information and things were glued together. In the information age, information flows freely independent of the physical modes that previously bound them. Predicated upon this notion, we propose that strategic IT using technologies that provide for sustained competitive advantage will enhance one or more of these three dimensions of information navigation: richness, reach, or affiliation.

STRATEGIC IT PLUS

As established earlier, disruptive technology can become leveling technology quickly as it transfers to all members of a competitive rivalry. This makes any first-mover advantage temporary at best. Examples of sustained competitive advantage not based on proprietary technology often combine disruptive technology with other organizational factors. For example, Toyota employs IT for richness, reach, and affiliation, but it also combines these technologies with strong branding, world-class manufacturing capabilities, innovative product design, and superior customer relationship management. The result has been consistent competitive advantage and growth in market share.

Consider too how the technologies employed by Dell are easily duplicated. But, what is not easily duplicated are these technologies coupled with a direct-to-consumer supply chain built from the ground up, a just-in-time manufacturing system based on a closely affiliated supply chain, and a human resources strategy supporting this innovative business model. As noted earlier, sustained competitive advantage comes not purely from IT but more often from organizational and managerial structures that take full advantage of technology (Wainwright & Waring, 2004). It is this continuous refinement and reengineering of the organization, coupled with strategic technology, which provides for more sustained competitive advantage (Beard & Sumner, 2004). Perhaps, strategic "alignment" is too weak a term to describe the relationship between IT and strategy. "Integration" may capture the essence of this concept better (Weill & Broadbent, 1998; Evgeniou, 2002). As IT is fully integrated into both the strategic plan and the processes of an organization, all five forces can be utilized for sustained competitive advantage. Future research should investigate how specific, emerging technologies may impact specific forces and generate possibilities for sustained competitive advantage.

In conclusion, it must be acknowledged that neither competitive advantage gained through the application of strategic IT nor complementary organization structures nor managerial practices can ever remain static (Salmela & Spil, 2002). The nature of competition is that those who are behind attempt to catch up by imitating those who are successful or by leaping ahead. To stay competitive, organizations must continually implement technologies capable of influencing the strategic forces to their benefit. This has been termed "IS capability" and captures the concept of organizational value and competitiveness leveraged through application of strategic systems (Peppard & Ward, 2004). But, that is not enough. Organizations also must adopt the organizational and managerial practices that support these technologies. IT strategy, when integrated with business strategy, is a process of continually examining the competitive forces in the industry and leveraging these forces for advantage using IT and organizational reengineering.