Managing Value-Creation in the Digital Economy

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INTRODUCTION

Value-creation and maintenance of a sustained revenue stream in the digital economy continue to elude most businesses. With the exception of advanced firms such as Dell™, Virgin®, Yahoo!®, and eBay®, relatively few firms have been able to leverage Internet technologies to create sustainable business models. From a strategic perspective, although firms are freed of the strictures of vertical integration, they face the daunting task of orchestrating a constantly changing web of suppliers and partners to create appealing products for increasingly sophisticated, fickle customers.

Contemporary research, often based on frameworks such as Porter's Five Forces (Porter, 1984), has proliferated myriad, largely static business models. For example, Tapscott et al. (2000) proposed five distinct models—agoras, aggregations, alliances, distribution networks, and value chains, while Weill and Vitale (2001) proposed six—direct to customer, content provider, full-service provider, portals, shared infrastructure, and whole of enterprise. By not explicitly accounting for today's dynamic business environment, these models offer limited prescriptions for sustained value-creation. Fundamental to sustainability is business model evolution, which often entails the transfer of knowledge, processes, partnerships, and relational capital from one group of customers to another. For the IT-enabled firm, sustainable value-creation increasingly depends on its ability to combine intangible assets (i.e., brand, information resources, relational capital) with those of its network partners (Brandenberger & Nalebluff, 1996; Gulati et al., 2000; Tapscott et al., 2000).

This entry synthesizes research from strategic management and IT to develop a framework for understanding sustained value-creation. In contrast to much of the literature on IT-enabled competition (Afuah & Tucci, 2001; Osterwalder & Pigneur, 2002; Weill & Vitale, 2001), it does not focus on e-business models per se, but instead reinterprets the traditional three stages of strategy making (conceptualization, planning, and implementation) to describe how distinct types of information may be used for sustained value-creation. We chose to focus on the strategy aspect of value-creation, because business models are tangible representations of a firm's strategic intent. In other words, they are the outcome of a firm's strategy. Hereinafter, we use the term "product" to describe both tangible products and intangible services and the term "strategy" to describe the protocol that firms use to create valuable products and services.

This article is organized into two sections, first, drawing on two features of information: velocity (rate of change) and interoperability (the extent to which information can be combined with other information to create value). It develops a 2×2 matrix depicting four fundamental types of information necessary to understand information-driven competition (Figure 1). Next, it develops a conceptualization of sustained value-creation by using the information typology and IT's considerable information-gathering and coordination capabilities as a lens to reinterpret the three stages of strategy.

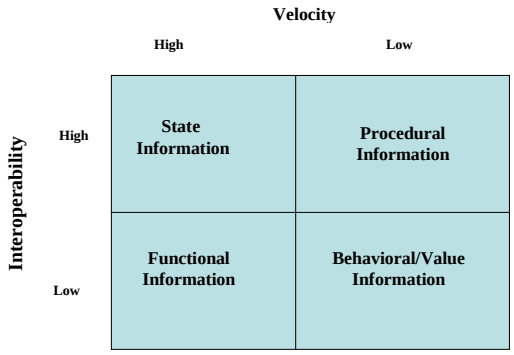
FOUR FUNDAMENTAL INFORMATION TYPES

This section draws on two characteristics of information—velocity and interoperability to develop a typology (Mc Intosh & Siau, 2001). Each type is discussed.

State Information

Typically descriptive in nature, state information changes rapidly (high velocity) and can be easily combined with other information to create value (high interoperability). Examples of state information include the price of a commodity at a specific day and time; the quantity of a product in inventory; and the chronology of a product's journey through a firm's value chain. General Motor's information system, for example, provides state information concerning the number of engine assemblies in inventory and the mix of automobiles on a car carrier in the distribution system (Mc Intosh & Siau, 2001).

Figure 1. Typology of information based on velocity and interoperability



Procedural Information

Procedural information, characterized by low velocity and high interoperability, refers to the steps or protocols required to conduct a process or perform a service. It can be combined with other information to create efficient business processes. For example, best practices for a particular industry may be combined with knowledge of company-specific practices to improve business processes. Procedural information therefore tends to be more explicit and relatively easily codifiable (Mc Intosh & Siau, 2001).

Functional Information

Functional information describes how components and subsystems of a tangible product interact and how those interactions give rise to the performance features that characterize a product. The most common, engineering knowledge, is high velocity (applied technical information changes rapidly), of low interoperability (applicable to a narrow domain), and is grounded in an understanding of the technologies that constitute a product and how variations in those technologies can affect overall system performance. In PC design, functional information regarding microprocessor speed, hard drive access time, and the amount of RAM permits engineers to design systems with differing performance characteristics. Unlike procedural information, functional information tends to be more complex, tacit, and cannot be as easily captured and represented in an organization's databases as can state and procedural information (Mc Intosh & Siau, 2001).

Behavioral/Value Information

This information type, characterized by low velocity/low interoperability, refers to the way large-scale, complex systems interact under different environmental conditions. It may be used to predict the future actions of complex systems, such as the trajectory of a hurricane, the competitive outcomes from adding a new partner to a value web, or customer response to a new channel. For example, capturing information about individual customers and buying preferences might allow the firm to create a model of consumer preference for particular product offerings and thus enable it to fine-tune its marketing and sales initiatives (Mc Intosh & Siau, 2001).

UNDERSTANDING SUSTAINED VALUE-CREATION

The Internet is a double-edged sword for today's managers. Freed from the constraints of vertical integration and costly coordination, managers enjoy unprecedented flexibility to create appealing products and services by mixing and matching resources and capabilities from their value-webs. Nevertheless, the Internet's dynamic nature, hypercompetition (D'Aveni, 1995), and accelerating global competition, force managers to cope with shorter, more frequent design–build cycles, quicker market feedback, and greater opportunities for product evolution. Despite this, most business models, operating under assumptions of linearity, constrain managerial action to the proverbial single-board chess game. Stated differently, the linear, three-stage conception of strategy (conceptualization/planning/implementation) now becomes iterative, with each cycle offering opportunities for learning, adaptation, and sustained value-creation. This arises from IT's information gathering and coordinative capabilities that enable managers to incorporate, at any stage, new information, resources, and capabilities, from the firm's value-web. The chess game, now played on three boards, permits horizontal and vertical moves.

Chess Board 1: Conceptual Stage

Proponents of the resource-based view (Barney, 1991; Grant, 1995; Wernerfelt, 1984) demonstrate that product conceptualization is conditioned by the firm's resources and capabilities. Managers use the firm's market knowledge (i.e., customer tastes and preferences) and technology knowledge (what technological capabilities can be used to meet market demands) to create products. The overlap of these two domains (Figure 2) represents the firm's product opportunity set. By allowing managers to access knowledge resources from value-web partners, IT expands both knowledge domains to offer a broader product opportunity set (Hamel, 2000; Piller et al., 2000; Spencer, 2003). For example, a firm in the automobile performance components industry may combine procedural information (from a value-web partner possessing expertise in carbon-fiber composites) with functional information (concerning how air flows within an intake system) to offer a lightweight, high-performance manifold.