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Making IT Matter: A Manager's Guide to Creating and Sustaining Competitive Advantage with Information Systems

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Making IT Matter: A Manager's Guide to Creating and Sustaining Competitive Advantage with Information Systems

Abstract

Some industry observers have suggested that information technology (IT) has lost its ability to be a strategic resource for modern organizations. However, such examples as Harrah's and Ritz-Carlton present evidence to the contrary. Harrah's has used IT to gather substantial business intelligence and identify its best customers, while Ritz-Carlton uses IT to personalize every guest room and every stay for its returning customers. Many other firms outside the industry, such as Dell, eBay, and Lands' End, provide further evidence of how sustained competitive advantage can be built around IT. While the task is not easy, when firms are successful in doing so the rewards can be tremendous.

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A Manager's Guide to Creating and Sustaining Competitive Advantage with Information Systems

By Gabriele Piccoli, Ph.D.

The Center for Hospitality Research AT Cornell University

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SOME INDUSTRY OBSERVERS have suggested that information technology (IT) has lost its ability to be a strategic resource for modern organizations. However, such examples as Harrah's and Ritz-Carlton present evidence to the contrary. Harrah's has used IT to gather substantial business intelligence and identify its best customers, while Ritz-Carlton uses IT to personalize every guest room and every stay for its returning customers. Many other firms outside the industry, such as Dell, eBay, and Lands' End, provide further evidence of how sustained competitive advantage can be built around IT. While the task is not easy, when firms are successful in doing so the rewards can be tremendous.

To exploit the strategic potential of IT managers must:

(1) Realize that there is a fundamental difference between information technology and information systems;

(2) Clearly differentiate strategic information systems from tactical information systems;

(3) Evaluate the role of IT in creating value and focus on the design and implementation of IT-dependent strategic initiatives rather than on IT investments;

(4) Evaluate how the resources at the disposal of their firm combine with competitors' structural inadequacies to create the potential for value creation and appropriation;

(5) Evaluate how to exploit the characteristics of the IT development and implementation life cycle to estimate the extent of response lag as competitors attempt to imitate the initiative;

(6) Evaluate how to exploit the characteristics of the value system in which their firm is embedded to preempt competitors' response and create obstacles to replication; and

(7) Evaluate the evolutionary paths available to the firm to reinforce barriers to erosion of competitive advantage associated with IT-dependent strategic initiatives.

This report offers a framework that can help managers formally analyze existing and proposed IT-dependent strategic initiatives and offers a series

of questions to guide the analysis. The framework begins with the following background questions:

(1) Is the proposed initiative aligned with the firm's strategy?;

(2) Is the proposed initiative designed to reduce the firm's costs or to increase customers' willingness to pay?; and

(3) What is the IS design underpinning the proposed initiative?

With the answers to those questions in hand, a manager can continue the analysis with the following questions regarding the extent to which the competitive advantage arising from the IS initiative is sustainable.

(4) What competitors are appropriately positioned to replicate the initiative?;

(5) How long before competitors have the same functionality in place?;

(6) Will replication do competitors any good?; and

(7) What evolutionary paths does the innovation create that the innovator can exploit?

Finally, having concluded the background and sustainability analysis, the manager can make one of the following three determinations about the proposed IS strategic initiative:

(1) Develop the IT-dependent strategic initiative independently, if the competitive advantage is deemed sustainable;

(2) Develop the IT-dependent strategic initiative as part of a consortium, if the competitive advantage is not sustainable, but the business and the industry as a whole will profit from the initiative; or

(3) Shelve the proposed initiative, if competitors' response will degrade value-appropriation potential for all.

About the Author

Gabriele Piccoli, Ph.D., is an assistant professor of information systems at the Cornell University School of Hotel Administration. Widely published in information systems and information technology journals, his research and teaching expertise is on the strategic application of information technology, electronic commerce, and IT-enabled customer service.

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THOSE AMONG US WHO HAVE BEEN CONCERNED WITH INFORMATION TECHNOLOGY (IT) for less than a decade may think that the IT community is facing challenges never thrown its way before. After all, how do you respond to accusations of the kind found in the article titled, "IT Doesn't Matter," published in the *Harvard Business Review*?[1]

To be sure, there is evidence that many hospitality firms are not using IT strategically and are not achieving benefits commensurate with the substantial sums of money being expended on IT. As an example, a recent study by McKinsey concluded that after spending $7.6 billion in IT between 1995 and 2000, the lodging industry saw no increase in revenue (after controlling for the effects of the booming economy) and no tangible increase in productivity.[2]

The uncertainty many executives feel about how to wrest value from their IT investments inspired this report. Surveys have historically shown remarkable consistency with the finding that the average executive feels that IT decisions are well outside of her or his comfort zone.

Compounding this problem is the historical fact that the information systems (IS) function has traditionally been led by technologists. Because of the vastly different background and knowledge base of the business executives and the technology executives, the result has often been failed communication and a delegation of "all IT issues" to technologists.

More recently, we have witnessed a trend reversal, with the IS function being led by many "new school" CIOs, who are well versed in the business. While this is a step in the right direction, it is hardly enough, for all executives must care about IT. As the SVP of sales and marketing of a branded lodging company recently told me: "Every manager must have an IT strategy. You can't delegate to technologists and only worry about your allocated cost or what training your employees need. You must understand how to be master of your own destiny and make IT work best for you."

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[1] Nicholas G. Carr, "IT Doesn't Matter," *Harvard Business Review*, May 2003, pp. 5–12; *HBR* stirred that same pot in similar fashion in 1972 with an article titled "MIS Is a Mirage," and in 1966 with a piece titled, "The Myth of Real-Time Management Information."
[2] P. Brown and K. Stange, "Investment in Information Technology: The Multi-Billion Dollar Game of Chance," *Hospitality Business Review*, 2002.

This is because, as talented as today's CIOs are, they are not spending their time addressing operations problems the way COOs do, marketing problems the way CMOs do, or financial problems the way CFOs do. Mind you, this is not a call for hospitality executives to become IT technicians. Instead, I believe that knowing how to use IT strategically does not so much involve a deep understanding of how technology works (even though a bit helps) as it does a deep understanding of how IT can be used to create and to appropriate economic value.

As I demonstrate in this report, quibbling about whether IT matters is a waste of time. IT does matter, of course, and companies like eBay, Dell Computers, and Wal-Mart have amply demonstrated that it does. Wal-Mart, for instance, leveraged IT to create an unparalleled inventory-control system. Dell has succeeded with a high-velocity built-to-order model, while eBay uses technology to enable its position as the primary online auction site (arguably the only such site). The travel and tourism industries have also had their share of IT success stories: American Airlines' SABRE is the stuff of legends, and Radisson's look-to-book initiative has also proven quite successful. Other recent examples include Ritz-Carlton's personalization strategy and Harrah's Entertainment's business-intelligence initiative. The real question then is: What do managers need to know to make IT work strategically for their company? This report answers that question.

The report starts with a crucial differentiation between information systems (IS) and information technology (IT). It then focuses on strategic information systems and how they can be used to create and appropriate economic value. After discussing established frameworks for value creation, I introduce the notion of barriers to replication. Using this concept I show how innovative IT-based initiatives can be analyzed to evaluate their potential for sustainable advantage. The report concludes with a series of key questions that management must ask to assess the sustainability of any IT-enabled strategic initiative. The answers to those questions will tell management how to proceed with the initiative, and, indeed, whether to proceed at all. For those managers who find their company trailing an innovator, the framework helps deciding whether to imitate and, if so, how to best proceed.

Not All IT Is Created Equal

Over 35 years of information-systems research has demonstrated that not all technologies are created equal or behave the same—particularly when used strategically. An example will show how different technologies can produce dramatically dissimilar results from a competitive standpoint.

High Speed Internet Access

During the dot.com days of the late 1990s, as the number of internet users was increasing at a staggering rate, a host of providers began to offer in-room high-speed internet access (HSIA) capability to hotels. Soon HSIA became one of the hottest technologies to hit the lodging industry in a while, with hotels implementing the technology and offering it as a paid amenity ($9.95 for unlimited use being the most popular pricing option).

Understanding the difference between information systems (IS) and information technology (IT) is crucial to using IT strategically.

While take rates were much lower than expected, HSIA quickly became a "must-offer" amenity, based on the assumption that business travelers, who were used to high-speed connections at home and in the office, would snub hotels that could not have them surfing in the fast lane.

The inevitable result was an increasing number of properties that offered HSIA free as an amenity. For example, in February 2001 the Sheraton Vancouver Wall Centre announced that it was offering HSIA free of charge to all guests. In the press release introducing the initiative the HSIA vendor declared: "Offering this service as an amenity with no charge to the guest will certainly differentiate the Sheraton Vancouver Wall Centre from its competitors." Any hoped-for differentiation did not last long, however, as more properties joined the "free amenity" band-

wagon. Soon this amenity moved to the brand level, with, for example, Omni Hotels offering it system-wide to all guests starting in February 2003 and Best Western following suit in 2004.

Following the trend of countless amenities before it, HSIA is rapidly becoming a cost of doing business for hotels, because (as I explain below) it cannot be protected and customers have appropriated the added value from this IT innovation.

Business Intelligence at Harrah's Entertainment

Harrah's Entertainment has been recently widely celebrated for its innovative use of IT in support of its efforts to better understand its customers—a type of initiative known as business intelligence. To do so, Harrah's had to invest heavily in technology solutions—an investment estimated to exceed $100 million in 2000. Such expenditure may seem huge, but the firm made a trade-off decision not to invest in properties that would wow visitors with their size and elaborate design, and instead used the money thus saved to create a sound technological and organizational brand-wide infrastructure.

Technology is only the beginning of this story though. Harrah's did not simply buy a bunch of computer systems, flip on the switch, and watch the dollars roll in. Instead, the firm embarked on a bold reorganization, centralizing and focusing operations around the brand and away from individual property interests. As part of the reorganization Harrah's hired a new breed of analysts, known as decision scientists. These individuals had the mindset and the skills to gather and analyze data about gamblers' characteristics and activities. By carrying out scientific experiments, Harrah's was able to become both more efficient (i.e., spend less) and effective (i.e., spend better) in its use of funds to attract and retain customers, while also increasing share-of-wallet.

The returns on this use of technology have been considerable for Harrah's, even in the face of a slowing economy. At the same time, the centralized IT infrastructure and the processes it has developed enable Harrah's to expand its distribution with relative ease and control. For Harrah's Entertainment, then, IT does matter!

If nothing else, the above examples raise the questions of whether managers should approach distinct IT-based initiatives differently from each other. Put another way, does IT matter sometimes but not others?

Two Fundamental Premises

Analyzing the strategic potential of IT begins with establishing two fundamental premises: first, IS ≠ IT; and, second, exactly what it is that constitutes a *strategic* information system.

IS ≠ IT

Without doubt, information technology engenders a plentitude of confusing lingo, technical terms, and acronyms—a problem compounded by the wealth of half-prepared, fast-talking individuals using terminology incorrectly. Of all the potentially confusing terms, none is more insidious than the term information system, usually abbreviated IS. In this context, information system is often used as a rough synonym for information technology. But there is a critical difference between IT and IS. Information technology is a *component*—albeit a fundamental one—of an information system.

The distinction between IS and IT is clarified by the following simple example. The famous Plaza Hotel in New York City opened its doors on October 1, 1907.[3] Did the Plaza have an information system when it was inaugurated? The answer is yes, of course. The Plaza's information system allowed it to take reservations, to check guests in and out, to keep track of room status, and to manage its inventory of amenities and equipment. Yet, the first known front-office implementation of IT in a hotel (that is, a computer system) did not occur until June 27, 1963, when the New York Hilton introduced its card-reader-based, batch-processed front-desk system.[4] Clearly, while information technology is a fundamental component of any modern information system, IT and IS are not synonyms.

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[3] See: www.fairmont.com.
[4] See: Charles I. Sayles, "New York Hilton's Data-processing System," *Cornell Hotel and Restaurant Administration Quarterly*, Vol. 4, No. 2 (August 1963), p. 41; and Roy Alvarez, Dennis H. Ferguson, and Jerry Dunn, "How Not to Automate Your Front Office," *Cornell Hotel and Restaurant Administration Quarterly*, Vol. 24, No. 3 (November 1983), pp. 56–62. Interestingly, the system was not speedy enough for the New York Hilton's needs, and within a year the hotel had to remove the front-desk computers—until IT caught up with the hotel's IS needs.

With this example in mind, I define an information system as a socio-technical system that includes IT, processes, people, and organizational structure. All four components are necessary to deliver the information-processing functionalities of the IS. More important, any change in one component (e.g., a new software program, a change in organizational structure from property-centric to brand-centric) will affect and require adjustment in each of the other components—that is, any change has systemic effects.

The distinction between IT and IS is fundamental toward understanding the strategic potential of information systems and of technology. With the distinction between IT and IS clarified, it should be evident why the firm that focuses solely on IT investments to become competitive (i.e., blindly purchasing computer systems) is wasting its money. IT investments make sense only as components of information systems whose information-processing functionality is thought to lead to an improved competitive position.

Adding Strategic to Information Systems

The second fundamental premise is to establish what aspects of an information system make it strategic. The foremost objective of strategy in for-profit business ventures is to achieve and sustain superior financial performance. To do so the firm uses its resources to create value by either reducing costs[5] or by increasing the customers' willingness to pay for its product or services. A firm achieves competitive advantage when it is able to create distinctive value that no other firm offers by creating a positive difference between customers' willingness to pay and the firm's costs. At that point, the firm is in a position to appropriate the added value it has created in the form of profits.

As competitive dynamics play out, the firm's competitors will try to replicate or substitute the innovator's value-adding strategy. When competitors succeed in copying the innovator, it will face

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[5] Strictly speaking, value creation is the difference between customers' willingness to pay (the maximum amount of money customers are willing to give to the firm to obtain its products and services) and supplier opportunity cost (the minimum amount of money the firm's suppliers are willing to accept to work with the firm). For simplicity I use the actual firm cost as a proxy for supplier opportunity cost as actual cost is more intuitive.

price pressure leading to customers' appropriation of value—as is occurring with free HSIA.

Strategic information systems are those that enable the creation of the distinctive added value. The following two key insights follow from this definition of strategic information systems.

(1) Strategic information systems are not defined by their functionality or the organizational function they support, but instead they are defined in terms of their objectives and the purpose they serve—improving the firm's competitive standing.

(2) Contrary to conventional wisdom, strategic information systems do not have to rely on proprietary technology. eBay, for example, has dominated the online auction market since its inception using commonly available technology, namely, the internet. A simple look at competitors' auction sites (e.g., Yahoo!, Amazon.com)

> **I**nformation technology has spawned a plentitude of confusing lingo, but the important concept is that an information system includes information technology, as well as people, processes, and organizational structures.

reveals that they offer comparable functionalities. The key lesson here is that what needs to be distinctive and hard to imitate is the value-creating strategy that is built on a specifically designed information system of which the technology is a fundamental component. As I discuss below, replicating the IT at the core of defendable strategic information systems is often a useless move.

The definition of strategic information systems given here is useful in discriminating the many systems that are _not_ strategic. These are systems that do not position the firm to create distinctive value, even though they are important and sometimes crucial for the business's operations. I refer to these as tactical systems. Some examples follow.

- A restaurant's fundamental information system, anchored by its POS, which is used to manage reservations, seating, order taking, and delivery, is crucial to the operation of modern res-

taurants. A system such as this is generally tactical, because it rarely creates distinctive value.

- Likewise, a hotel's fundamental information system, built around the PMS it uses to manage room reservations, is crucial to operations. Even though it's unlikely that any hotel beyond a tiny property could efficiently run without such a system, it is tactical, for it generally does not create distinctive value.

> **H**otel companies can use information technology to create and appropriate added value when their strategic initiatives build barriers to erosion.

- Similarly, no matter how well it is run, an e-mail system is unlikely to be the foundation of a strategic information system. The same argument can be made for productivity software such as Microsoft Word and Excel, no matter how advanced their features may be.

Implementing or upgrading tactical systems will therefore not create strategic advantage. Thus the following two key questions remain. How can IT be used to create added value? How can the firm ensure its ability to appropriate the value created over time?

How IT Can Create Added Value

In the course of explaining the nature of hospitality IT applications, I have hinted at the ways that some operations have used information systems to create added value. In the examples that follow, I point out in greater detail how technology can be used to create value by either reducing the firm's costs or by increasing the customers' willingness to pay for the firm's product or services. Returning to the case of Harrah's Entertainment, here is an example of a strategy that creates value by reducing the firm's cost. Drawing on the information provided by guests who use their total rewards cards, Harrah's has been able to fine tune its use of comps. By some accounts, with its ability to efficiently disburse

its comp budget, Harrah's has saved enough money to pay for the technology. An example of a strategy that increases customers' willingness to pay is that of Wyndham ByRequest. For a segment of business travelers, namely those frequent travelers that don't travel often enough to redeem competitors' points, the instant gratification offered by Wyndham ByRequest may offer considerable value. Converting these frequent guests to loyal Wyndham customers is a way for Wyndham to appropriate the value it created, without having to increase rates.[6]

The key insight is that the companies involved focused not on the technology but on what I term IT-dependent strategic initiatives. IT-dependent strategic initiatives are those projects that rely heavily on IT (i.e., they cannot feasibly be enacted without investments in IT) to create added value. IT-dependent strategic initiatives consist of the configuration of an activity system that is enabled by IT and is designed to create and appropriate economic value. Typical strategic initiatives include business-process reengineering, customer-relationship management, organizational learning, knowledge management, electronic commerce, electronic business, and infrastructure initiatives, as well as such limited programs as introducing internet cafés on cruise ships.

A number of frameworks have been advanced over the years to help managers in evaluating and developing IT-dependent strategic initiatives. In the remainder of this section I highlight some of those frameworks with references to material that describes them in depth.

Critical Success Factors

The critical-success-factor (CSF) methodology focuses on the use of information systems to further a business's key performance drivers.[7] Thus, the

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[6] This example helps to highlight the fundamental insight that price decisions are consequential to value creation. To create value a firm needs to do something customers value, so that they are willing to pay for it. Simply raising prices is not a value-creating strategy. On the other hand, having created value, the firm can increase prices or find other ways to appropriate it. For example, while Wyndham may leave rates unchanged, every loyal customer who books on the company website (instead of through a third party) creates much more flow-through to the bottom line, thus allowing Wyndham to appropriate some of the value it created.

[7] J. Rockart, "Chief Executives Define their Own Data Needs," *Harvard Business Review*, Vol. 57 (March–April 1979), pp. 81–93.

CSF approach calls for evaluating whether an IT-dependent strategic initiative will have a favorable effect on those drivers. This approach enables the firm to prioritize initiatives in a structured fashion based on accepted drivers of performance.

Value Chain

The classic value-chain model shows how information can be used at any stage of the value-creation process to lower costs, enhance differentiation, or support relationships among different firms in a value system. [8]

Virtual Value Chain

The virtual value chain (VVC) model focuses on the use of information to create value.[9] It shows how managers can use the substantial amount of information that is typically generated during the course of business and transform it into valuable insights, new processes, or new products or services.

Customer Service Life Cycle

The Customer Service Life Cycle (CSLC) focuses on the use of technology to enable outstanding customer service.[10] The CSLC breaks down the firm–customer relationships into twelve stages and demonstrates how IT can be used to support customers' needs and create value at each stage.

Regardless of which model a company uses to explore value creation, that is only half the battle. Appropriating the value created is the other half.

Appropriating Value Over Time

The major criticism levied against the potential for sustained performance associated with IT innovation is that technology is easily replicated by competitors, who can quickly offer the same functionalities. Put in the framework of value creation, the accusation is that IT helps compa-nies create value that they cannot appropriate over time because competitors can easily imitate the innovation. This argument simply misses the point. Because IS ≠ IT, creating and appropriating value hinges on successfully deploying a defendable IT-dependent strategic initiative.

Response lag. Competitive imitation occurs in stages. Once a firm's rivals find themselves at a disadvantage, they search for the sources of the firm's competitive advantage. If they are successful in identifying those sources, the competitors must decide whether they are able and willing to respond and, if they are, what approach to take. Response lag, that is, the time it takes competitors to respond aggressively enough to erode a firm's competitive advantage, is the delay in competitive response. The longer the time and the higher the cost of replication, the more resilient is the firm's advantage. Response-lag drivers are defined here as the characteristics of the technology, the firm, its competitors, or the value system in which the firm is embedded, that combine to make replication of the IT-dependent strategic initiative difficult and costly.

My analysis of the strategic-information-systems literature and my own research of multiple cases[11] suggest that response-lag drivers can be grouped into one of the following four barriers to erosion of competitive advantage: **(1)** IT-resources barrier, **(2)** complementary-resources barrier, **(3)** IT-project barrier, and **(4)** preemption barrier. The magnitude of each barrier to erosion is determined by the strength of its response-lag drivers. I briefly describe each barrier to erosion below and detail each of the response-lag drivers associated with them in the appendix.

Barrier 1: **IT resources.** IT-dependent strategic initiatives rely on access to the resources and capabilities necessary to produce and use the technology at the core. Two classes of response-lag drivers contribute to the height of the IT-resources barrier; these are IT resources and

[8] M. Porter and V. Millar, "How Information Gives You a Competitive Advantage," *Harvard Business Review*, Vol. 63 (July–August 1985), pp. 149–160.

[9] J. Rayport and J. Sviokla, "Exploiting the Virtual Value Chain," *Harvard Business Review*, Vol. 73 (November–December 1995), pp. 75–85.

[10] G. Piccoli, B.R. Spalding, and B. Ives, "The Customer Service Life Cycle: A Framework for Internet Use in Support of Customer Service," *Cornell Hotel and Restaurant Administration Quarterly*, Vol. 42, No. 3 (June 2001), pp. 38–45.

[11] See, for example: G. Piccoli and L.M. Applegate, "Canyon Ranch," *Harvard Business School Publishing*, 9-805-027, 2004; G. Piccoli, B. Bass, and B. Ives, "Custom Made Apparel at Lands' End," *MIS Quarterly Executive*, Vol. 2, No. 2 (2003), pp. 74 – 85; G. Piccoli and L.M. Applegate, "Wyndham International: Fostering High-Touch with High-Tech," *Harvard Business School Publishing*, 9-803-092, 2003; and B. Ives and G. Piccoli, "Rice Epicurean Shopping: Decadence or Destiny?," *Communications of the AIS*, Vol. 9, Article 18 (2002).

Hospitality companies have available numerous response-lag drivers that help build the barriers to erosion. The following are the drivers that support the IT resources barrier.

IT Assets

IT assets are technology resources available to the organization, including hardware components (e.g., a private network connecting globally distributed locations), software applications and environments (e.g., a proprietary revenue management system using custom-developed models), and data repositories. These resources contribute to building response lag directly, by simplifying and speeding up the development and introduction of the initiative's IT core, or indirectly, by making it difficult for competitors who have no ready access to the needed IT resources to replicate leader's initiative.

IT Infrastructure

An IT infrastructure is a set of IT components that are interconnected and managed by IT specialists with the objective of providing a set of standard services to the organization. Thus, the IT infrastructure provides the foundation for the delivery of business applications. With IT infrastructure-development times generally estimated to exceed five years, the response lag and ensuing barrier to imitation is likely to be substantial.

Information Repositories

Information is now widely recognized as a fundamental organizational resource, and firms are investing significantly to improve their ability to collect, store, manage, and distribute it. Information repositories are often large data stores containing extensive information about customers, suppliers, products, or operations, organized in a structured form that is accessible and useable for decision-making purposes. A firm's information repositories can contribute to the development of substantial response lag by supporting strategic initiatives. Competitors attempting to replicate the leader's strategic initiative must not only duplicate the IT at its core, but they must also accumulate a comparable information resource—a feat that, by definition, often takes substantial time.

IT Capabilities

IT capabilities are derived from the skills and abilities of the firm's workforce. These capabilities directly influence the response lag associated with the introduction of IT at the core of IT-dependent strategies because they facilitate the technology's design and development. These capabilities also play a fundamental role in enabling effective and timely implementation, maintenance, and use of the technology.

IT Technical Skills and Business Understanding

IT technical skills relate to the ability to design and develop effective computer applications. They include proficiency in system analysis and design, infrastructure design, and programming. Another element is the depth of business understanding of IT specialists. Business understanding enables the IT specialists charged with developing the technology supporting IT-dependent strategic initiatives to envision a creative and feasible technical solution to business problems. A high level of business understanding also contributes to the creation of response lag by mitigating the risks associated with the introduction of the strategic initiative and the relative investments in technology.

IT-management Skills

IT-management skills refer to the firm's ability to provide leadership for the IS function, manage IT projects, integrate different technical skills, evaluate technology options, select appropriate technology sources, and manage change ensuing from the introduction of IT. IT-management skills, because of their idiosyncratic and socially complex nature and the learning curve associated with their development, are a source of sustainable competitive advantage. Managerial IT skills can contribute to creating substantial response lag when techniques and routines developed over time can substantially reduce development costs and development lead times. Competitors who attempt to replicate the initiative but lack the same high level of managerial
IT skills as the innovator face substantial obstacles to imitation.

Relationship Asset

The relationship asset is accumulated over time and finds its roots in a mutual respect and trusting rapport between the IS function and business managers. When a firm has developed a substantial relationship asset, IS specialists and business managers are able to work together effectively by coordinating and communicating extensively. Having developed the relationship, they share a vision for the role of IT within the business. Business clients share the risk and accept the responsibility for IT projects, and IS specialists are able to anticipate a business's IT needs and devise solutions that support these needs.

IT capabilities. As an initiative becomes more reliant on preexisting IT such resources as the IT infrastructure and data repositories and such capabilities as IT development and management skills, it becomes increasingly difficult to copy.

Barrier 2: **Complementary resources.** While IT is by definition a fundamental component of any IT-dependent strategic initiative, successful implementation of such an initiative requires that complementary organizational resources be mobilized as well. Thus, to implement an IT-dependent strategic initiative, the firm must develop or acquire the necessary complementary resources (e.g., physical assets such as a hotel, intangible assets such as a brand). As an initiative becomes more reliant on distinctive complementary resources, the complementary-resources barrier to imitation strengthens, and replication of the strategy becomes slower, costlier, and more difficult. In this situation, competitors will have to acquire or develop not only the IT at the core of the strategy, but also the complementary resources that underpin the initiative.

Barrier 3: **IT projects**. IT-dependent strategic initiatives rely on an essential enabling IT core, but they cannot be implemented until the necessary technology has been successfully introduced. The response-lag drivers of the IT project barrier are driven by the characteristics of the technology and the implementation process. Information technologies are not homogeneous, undifferentiated entities. To the contrary, they differ substantially with respect to their intrinsic characteristics, their ability to complement other organizational resources, the context in which they are introduced and used, and the degree of organizational change that needs to occur during the implementation process. For example, while a web site can easily be designed and deployed, large infrastructure projects (e.g., data warehouses) are complex, lengthy, and prone to failure.

Barrier 4: **Preemption**. Even if a competitor is able to replicate an IT initiative, the response may bear no fruit for the laggard. This is true when the IT-dependent strategic initiative pioneered by the first mover creates a preferential relationship with customers or other members of the value system and introduce substantial switching costs. Under these circumstances it is not enough for competitors merely to imitate the leader's strategy; they need either to compensate the customer for the cost of switching or provide enough additional value to justify the customer's decision to incur the switching costs. That is, imitators must be "that much better," where *that much* is an amount greater than the current value of all co-specialized investments that the customer has made.

The Dynamics of Sustainability

When launching IT-dependent strategic initiatives, as with any other strategic initiative, a firm must have a plan for continuously remaining ahead of the competition. This means looking for opportunities to reinvigorate and reinforce the barriers to erosion that I just discussed. Two primary ways to do this are capability development and asset-stock accumulation.

Capability development. Capability development is the process by which an organization is able to improve its performance over time by enhancing its ability to use available resources for maximum effectiveness. When it comes to IT-dependent strategic initiatives, the firm is able to engage in "learning by using" to develop

> **M**any of the assets that support strategic IT initiatives must be built up over time—thereby delaying competitors' efforts to imitate the initiative.

a superior ability to use the firm's resources. For example, reflecting on their success with SABRE, some of the pioneers suggested that SABRE was developed to respond to an internal crisis: managing American Airlines' growing inventory of seats and routes. Once SABRE was in place and American Airlines began using it with increasing competence, its potential as a distribution channel became apparent. As this example indicates, there is a mutually reinforcing dynamic between response-lag drivers and a firm's IT-dependent strategic initiative. Response-lag drivers offer the firm a "head start" on the competition. The enactment of the strategy enables the firm to engage in the learning process, leading to

further development of the response-lag drivers and the preservation of barriers to imitation.

Asset-stock accumulation. Many assets underpinning an IT-dependent strategic initiative cannot be acquired in the market (e.g., specialized databases and forecasting models, a company reputation or brand). Rather, such assets must be built up and developed over time as a result of a consistent process of accumulation. At the core of the Harrah's initiative that I discussed above, for example, are a comprehensive repository of personal and behavioral data about each gambler and predictive computer models of a gambler's projected worth. The ability Harrah's has to collect data and develop the predictive models depends on having the information systems for

> **Q**uestions to begin the analysis of an IT-dependent strategic initiative:
> **(1) Is the proposed initiative aligned with the firm's strategy?**
> **(2) Is the proposed initiative focused on reducing the firm's cost or increasing customers' willingness to pay?**
> **(3) What is the IS design underpinning the proposed initiative?**

data collection, storage, analysis, and distribution in place. These only became available when Harrah's launched its IT-dependent strategic initiative. Moreover, no matter how committed a competitor may be, the process of data accumulation requires time to complete. For example, if a destination customer visits a Las Vegas property once per quarter to play blackjack, collecting six data points about that customer (i.e., information on six visits) requires one and one-half years.

For these reasons, sustainability often does not stem from visionary one-time initiatives, but from evolutionary ones predicated on a commitment to capability building and asset-stock accumulation. On this basis, the firm can develop the strategic ini-

tiative, offering a moving target to its competitors by reinforcing its barriers to imitation over time.

In the next section I weave the above insights together to show how they can be used to help gauge the degree of sustainability of an IT-dependent strategic initiative.

Asking the Tough Questions about Sustainability

When looking to be innovative with information technology it is easy to get wrapped up in wishful thinking about the potential of IT. In this section I show how to use the concepts introduced above when evaluating IT-dependent initiatives either as innovators looking to protect an existing advantage, or as laggards looking for ways to attack the innovator. I have found that asking the series of increasingly specific questions given below provides the optimal procedure to approach this difficult analysis.[12] The focus here is on sustainability and I therefore assume that the IT-dependent strategic initiative does create value and is consistent with the firm's priorities. However, I offer a set of prerequisite questions for completeness of treatment.

Prerequisite Questions

(1) *Is the proposed initiative aligned with the firm's strategy?* This crucial question often goes unasked until late in the analysis. (Sometimes it never gets asked!) This question is important, because it is necessary for the proponents of the initiative to be able to formulate how the initiative advances the firm's positioning and strategy. To approach this question in a systematic manner, proponents should identify the firm's CSFs and clearly show how the initiative feeds those success factors by fostering the positive ones or curtailing threats.

(2) *Is the proposed initiative focused on reducing the firm's cost or increasing customers' willingness to pay?* Rare, but particularly coveted initiatives have the potential to accomplish both—decreasing the firm's cost while increasing customers' willingness to pay. The value of this question is in requiring managers to clearly define the value proposition of the planned initiative.

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[12] I frame the analysis here referring to a proposed initiative. Thus, I take the perspective of the innovator evaluating a new initiative. The same script can be used, with minor adjustments, by followers.

Barriers to Erosion #2: Complementary Resources Barrier

Hospitality companies have available numerous response-lag drivers that help build the barriers to erosion. The following are the drivers that support the complementary resources barrier.

Structural Resources

Structural resources comprise non-IT-related tangible and intangible internal assets used by the firm in the enactment of its IT-dependent strategic initiative.

Tangible Resources

In theory, any tangible resource available to the firm can underpin an IT-dependent strategic initiative. Among these are competitive scope, physical assets, scale of operations and market share, organizational structure, governance, and slack resources. A classic example of the application of tangible resources is Dell Corporation, which was able to parlay its direct-to-consumer sales model into a successful web-based strategy.

Intangible Resources

As in the case of tangible resources nearly any of a firm's intangible resources can support an IT-dependent initiative. Examples of commonly cited intangible resources that can be so applied include: corporate culture, top management's commitment, and the ability to manage risk. As with tangible IT resources, complementary intangible resources create response lag by making a strategic initiative difficult to imitate.

Action Resources

A firm's action resources define how the firm carries out its productive activities. The action resources specify what activities are performed and what steps or business processes make up those activities. The activities that the firm performs and the manner in which it performs them contribute to response lag and help sustain competitive advantage created by the initiative.

Activity System

A performance-maximizing activity system relies on a set of economic activities that are both interlocking and mutually reinforcing, expressly showing internal consistency (internal fit) and appropriately configured given the firm's external environment (external fit). Although IT is one of the fundamental components of the strategy, it still must fit within the entire activity system. When a firm has implemented a given configuration of activities and has developed the IT core supporting the linked activities, replication of the technology alone is insufficient for successful imitation. Indeed, narrowly replicating just the IT core leads to further

decline of the imitator's position by wasting time, money, and management attention without eroding the leader's competitive advantage. A classic example of a firm that has an idiosyncratic activity system is Southwest Airlines. Because Southwest does not cater flights, does not offer seat assignments, has a standardized fleet of aircrafts, uses less crowded airports, and focuses on point-to-point travel by price-sensitive customers, it is relatively resistant to competitive imitation. Merely imitating one aspect of Southwest's activity system will not suffice, but attempting to duplicate the entire package at minimum generates considerable response lag.

Business Processes

A business process is defined as the "specific ordering of work activities across time and place, with a beginning, an end, and clearly identified inputs and outputs: a structure for action."* The notion of business process is related to, but distinct from that of the economic activities discussed above. Economic activities describe the set of undertakings that the firm performs, while business processes describe the way in which the firm performs them. The contribution that business processes make to response lag and to the height of barriers to imitation depends on their distinctiveness and strategic value. When a firm is able to introduce an IT-dependent strategic initiative built around a business process with characteristics of uniqueness and differentiation, significant barriers to imitation are erected.

External Resources

External resources are assets (such as brand, reputation, and inter-organizational relationship assets) that do not reside internally with the firm but accumulate with other firms and with consumers. Generally intangible, external resources are usually developed over time.

When a firm's IT-dependent strategic initiative can make use of or contribute to the development of these external resources, it considerably improves response lag and augments barriers to imitation. Thus, the firm forces competitors to develop a comparable level of external resources before producing an effective response.

*T. Davenport, **Process Innovation: Reengineering Work through Information Technology** (Boston: Harvard Business School Press, 1993), p. 5.

Barriers to Erosion #3: IT Project Barriers

Hospitality companies have available numerous response-lag drivers that help build the barriers to erosion. The following are the drivers that support the IT project barriers.

IT Characteristics

Information technologies differ with respect to their complexity, distinctiveness, and visibility to competitors.

IT Complexity

Different IT applications have different degrees of complexity (e.g., complicated data warehouses versus simple web sites). The complexity of the technology is a function of the bundle of skills and knowledge necessary to effectively design, develop, implement, and use the IT in question. Technology complexity raises the IT project barrier by increasing development lead times for a competitive response.

IT Uniqueness

On the low end of the IT uniqueness continuum are self-contained, off-the-shelf IT products that need little integration or customization (e.g., an electronic mail system). At the high end are custom-developed applications or infrastructure subsystems that are unavailable in the open market. When the IT underlying the innovator's strategy is not distinctive, competitors can engage consultants or service firms to aid them in reducing knowledge barriers and, thereby, reduce the imitation response lag. Unique IT makes this process much more difficult.

Visibility

Visibility is the extent to which competitors can observe the enabling technology. The visibility dimension can be conceptualized as a continuum spanning from custom developed internal systems (e.g., a data warehouse), which are virtually invisible to competitors, to immediately visible inter-organizational or customer-facing systems that require extensive education and selling to external users or customers (e.g., an online

purchasing system). IT that is highly visible and is readily available for inspection by competitors limits the strength of the IT project barrier.

Implementation Process

Since different kinds of information technology are inherently dissimilar, it makes sense that the processes by which they are implemented and become available to the organization also differ. Depending on the implementation characteristics of the IT core of the strategic initiative in question, the strength of the barriers to imitation changes considerably.

Implementation-process Complexity

Implementation-process complexity is a function of the size and scope of the project, the number of functional units involved, the complexity of user requirements, and possible political issues, among other things. IT infrastructure projects represent a powerful example of complex systems that have a substantial lead time. While the components may be commodity-like (e.g., personal computers, server, telecommunication equipment), it is difficult to integrate them into an effective system.

Degree of Process Change

Business processes often need to change to fit a new system—particularly in the case of large, highly integrated enterprise systems. The challenges escalate when several organizations or operations use the technology involved in the strategic initiative. The more departments that are involved and the more organizational boundaries crossed, the harder and the riskier the change becomes. Yet, as complexity increases, so do the difficulties encountered by competitors in imitating the strategy.

(3) *What is the IS design underpinning the proposed initiative?* This question is designed to formalize even more the analysis begun with the second question. At this stage in the analysis one needs to achieve clarity with respect to the information-processing functionalities of the information system supporting the proposed initiative. Each of the four components—IT, people, processes, and organization structures—also needs to be discussed to evaluate what changes to the current information systems and what new resources may be needed.

Sustainability Questions

The analysis of sustainability assumes that the initiative has created value. At this point it is important for managers to receive some guidance regarding ways to appropriate that value (i.e., to ensure sustainability). While it is impossible to estimate perfectly the magnitude of any particular barrier to erosion, the purpose of this analysis is to refine the strategy, identify areas of potential weakness, and to identify areas where changes to the initiative—often small—can substantially strengthen it.

Perhaps the most important aspect of this analysis is to identify initiatives that are not sustainable. Because it is important to understand when to avoid investing in expensive IT projects, the following questions can raise red flags before substantial resources are committed to an initiative.

(1) *What competitors are appropriately positioned to replicate the initiative?* Based on a clear understanding of the characteristics of the proposed IT-dependent strategic initiative the objective of this competitor analysis is to evaluate the strength of the IT-resource and complementary-resource barriers to erosion. Competitor analysis allows the innovator to identify sources of asymmetry that can be exploited and amplified through the deployment of the proposed initiative. The boxes on pages 10, 13, 14, and 16 provide a list of response-lag drivers to guide this analysis. The objective is to design the initiative so that it takes advantage of the existing sources of asymmetry and provides a basis to reinforce them over time through capability development and asset-stock accumulation. A powerful opportunity here is to take advantage of competitors' rigidities, which are resources that hamper competitors' ability

to replicate an innovation. A classic example is provided by firms with strong distribution ties (e.g., Compaq computers, Levi's), which could not easily replicate direct sellers' use of the internet (e.g., Dell, Lands' End) because of channel conflict. While Compaq, for example,

Questions to assess the sustainability of an IT-dependent strategic initiative:
(1) What competitors are appropriately positioned to replicate the initiative?
(2) How long before competitors have the same information-processing functionality in place?
(3) Will replication do competitors any good?
(4) What evolutionary paths does the innovation create?

may have had the ability to sell directly as Dell does, it could not risk upsetting its dealers, who were responsible for the bulk of its distribution. The result of this analysis will be a clearer understanding of which competitors are in a position to respond quickly to the IT-dependent strategic initiative and which will instead need first to acquire necessary resources or capabilities. This analysis may also provide guidance as to how hard it would be for competitors to acquire these prerequisite resources. It is clear that when fundamental resources are heterogeneously distributed, simply replicating the technology at the core of the innovator's initiative is not enough to be able to offer a comparable value proposition.

(2) *How long before competitors have the same information-processing functionality in place?* This question is primarily concerned with the effort and response lag associated with the creation, rollout, and infusion of the information systems at the heart of the IT-dependent strategic initiative. This analysis yields an assessment of the strength of the IT project barrier.

Hospitality companies have available numerous response-lag drivers that help build the barriers to erosion. The following are the drivers that support the IT project barriers.

Switching Costs

Switching costs represent the total costs borne by the parties of an exchange when one of them leaves the exchange—including psychological, physical, and economic costs. "Switching costs are the norm, not the exception, in the information economy."[1] IT-dependent strategic initiatives, which rely heavily on the collection, storage, manipulation, and distribution of information, are particularly subject to switching costs.

Co-specialized Tangible Investments

An IT-dependent strategic initiative may require that the firm's customers acquire the physical assets necessary to participate in the initiative. The total capital outlay necessary to obtain these assets is termed co-specialized tangible investments. These range from computer hardware and telecommunication equipment to software applications and interfaces between the existing customer's systems and the firm's IT. For example, hotel franchisees buy costly interfaces for the franchising brands' reservation system. These interfaces become valueless if the property is re-branded. The extent to which the IT-dependent strategic initiative requires co-specialized tangible investments determines the potential for strong barriers to imitation associated with the initiative.

Co-specialized Intangible Investments

As is true of tangible investments, the deployment of an IT-dependent strategic initiative often necessitates a firm's customers or channel partners to invest time and money to take part in the initiative. An investment of this kind is known as a co-specialized intangible investment. For instance, to benefit from customer relationship management initiatives, customers often need to take the time to complete a profile. Co-specialized intangible investments might include "set-up" costs as well as ongoing costs (e.g., retraining new associates using a reservation system). Information repositories represent perhaps the most important class of co-specialized intangible investments in the information age. Considerable switching costs can be built on information accumulated over time. An interesting example is offered by information that is valuable only as long as the customer is using the firm's products or services (e.g., revenue-management models and historical records that are brand specific and become valueless if the hotel is re-branded).[2]

The same situation occurs even when switching costs are not readily apparent. Some forward-looking banks are attempting to take advantage of their many network connections to reach a position of "trusted consolidator" of top clients' complex financial positions. This strategy entails the collection of extensive information about customers' banking profiles and services used; insurance holdings; investment portfolio; mortgage, credit, and loan positions; and scheduled bill payments. The bank in this instance need not provide all of the services in question, but it strives to offer a consolidated view that customers find valuable and costly to transfer to competitors. Note that even when switching costs appear to be low, their presence can be critical for strategy development.

Value-system Structure

A firm does not engage in economic activity in isolation, but as a link in a larger value chain or system that includes upstream and downstream members. The structure of this value system can provide opportunities for preemptive strategies and for the exploitation of the response-lag drivers discussed here. The structure of the value system does not directly affect the strength of the preemption barrier to imitation, but instead magnifies or diminishes the preemptive effects of switching costs.

Relationship Exclusivity

An exclusive relationship exists when participants in the value system will elect to do business with only one firm that provides a particular set of products or services. The firm's counterpart (i.e., customer or supplier) places a premium on dealing with either the firm or one of its competitors, but not both. Relationship exclusivity is the norm with IT-dependent initiatives that provide integration services and that benefit from the accumulation of historical information. When first introduced, the American Airlines SABRE terminal for travel agents created strong incentives for relationship exclusivity, as travel agents did not want to waste valuable office space for competitors' proprietary terminals (e.g., United's Apollo), which were considered essentially duplicates of the SABRE terminal.

When a business relationship benefits from exclusivity, the customer faces penalties for hedging behavior and for sourcing the needed product or service from multiple firms. Thus, should competitors introduce

competing offers, customers are already invested in their relationship with the incumbent.

Concentrated Value-system Link

At each of the various stages or links of the value system the degree of concentration in the link is inversely proportional to the number of suitable business entities populating that link—where suitability depends on whether the firm would find the products or services offered by the vendors populating the link acceptable. A highly concentrated link is one where there are relatively few organizations or consumers available for the firm to use or serve. In the case of airline GDSs, for instance, the total number of travel agents serving the market targeted by the airline sponsoring the system represents the concentrated link. A market of given size will support only a finite number of competitors, and achieving a substantial penetration in the concentrated value-system link—by definition, a small market—is necessary to successfully preempt imitation. As the degree of concentration increases, the time necessary to secure a relationship with a substantial proportion of the link decreases—all else being equal. Consequently, the leader has a better chance of capturing a substantial proportion of relationships and be able to use switching costs to "lock out" competitors and maximize its barriers to imitation. Conversely, when a link in the value system comprises a large number of business entities, a firm is unlikely to effectively reach a critical mass of entities and raise substantial barriers to imitation in the same amount of time.

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[1] C. Shapiro and H. Varian, **Information Rules: A Strategic Guide to the Network Economy** (Boston: Harvard Business School Press, 1998), p.111. Also see this book for an excellent treatment of switching costs in the information age.

[2] The software here is neither proprietary nor brand specific, and the data are not acquired over a network or hosted by the brand. Yet, the historic data and the models the hotel has developed assume that the hotel has a given brand (e.g., Four Seasons). If the hotel is re-branded, while the software, the data, and the models are retained, their value is much lower because the data and models are specific to the original brand and assume the hotel sports the related flag (e.g., has access to the Four Seasons brand equity, reservation systems, loyal customer base).

A traditional IT development and implementation process follows life-cycle stages from inception to full functionality. This process generally includes the following sequential stages: vision, approval, build, rollout, and infusion.[13] Upon completion of the process the cycle often restarts with enhancements to the system.[14]

Competitors looking to have the same information-processing functionality in place need to enter a similar development and implementation cycle. The only difference is that a follower will start the process with an awakening phase, rather than a vision phase. The awakening stage occurs when the competitor realizes that the innovator has an advantage. The timing of the awakening depends on the characteristics of the initiative and can occur when the competitor begins to witness losses (e.g., market share, revenue), when the innovation is first introduced (typically for customer-facing systems), or even before the innovator has launched the initiative. Knowledge of behavior patterns exhibited by competitors may help in gauging the timing of the awakening and of the subsequent stages. For example, Burger King has traditionally shown a propensity to quickly enter geographical markets pioneered by McDonald's. While not technology related, this type of knowledge of the competition is what allows the innovator to estimate lead time more precisely. In some rare cases, some competitors will find imitation so daunting that they will elect not to follow. SABRE and Apollo emerged as the dominant airline reservation systems because other airlines elected early on not to follow the lead of American and United.

(3) *Will replication do competitors any good?* Armed with an understanding of which competitors will be in a position to respond to the innovation and a general idea of how long it may take them to have the same functionality

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[13] Infusion represents the process by which an innovation comes to permeate the organization and operations. This is a challenging stage that requires end-user acceptance and management sponsorship. If infusion is successful, the technology becomes an integral part of how the firm does business.

[14] The attentive reader will note that the rationale offered by those who suggest that IT is not strategic because it is easily imitable (for example, Carr, *op. cit.*) is that the technology can easily be replicated. In other words, this rationale addresses only the build and rollout phases of the IT development cycle. Those patient enough to read up to this point know that there is much more to IT-dependent strategic initiatives than simply technology development!

in place, the innovating firm should use this question to help estimate the magnitude of the preemption barrier to erosion. The fact is that being second sometimes means being left behind. Exploiting the characteristics of the innovation and the industry in which they compete, innovators can sometimes preempt any meaningful response by competitors. A case study that brings home this insight is offered by eBay. As I hinted above, imitation of eBay's IT-dependent strategic initiative by two formidable competitors, namely,

The analysis might show that it's wise to go ahead with the IT-dependent initiative (1) independently, (2) in an industry consortium, or (3) not at all—if the barriers to imitation are insufficient.

Amazon.com and Yahoo!, could not diminish eBay's dominance, even as it steadily raises its prices and continues to appropriate a substantial portion of the value it has created. The reason is to be found in the strong network effects that characterize the online auction market. The dominant player will be the one that first reaches critical mass (in this case, eBay). Being second in the online auction market does not count![15]

Even when outright preemption is not possible, the attentive innovator often has the ability to create substantial obstacles for any prospective imitator by levying switching costs at the appropriate stage in the value system. Preemption is strongest when the firm can identify a link in the value system where few customers or partners (e.g., suppliers) exist, and the partners that do exist place a premium on having an exclusive relationship with a firm. In this scenario, they may eventually sever their relationship with the

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[15] Interestingly, the eBay example shows that using proprietary IT is not a necessary condition for superior long-term performance.

firm and do business with a competitor, but they won't trade with both at the same time. For example, if a five-unit restaurant operation wants chain-wide forecasts and historical analyses of trends, such as those offered by business intelligence-data consolidators like Avero Inc., all five units must use Avero's software. From Avero's standpoint, customers (in this case, the five restaurants) place a premium on an exclusive relationship. They will all do business with Avero, or they all will switch to a competitor, but they will not work with two vendors at the same time.

When such conditions are present or can be created, switching costs have the most power in raising the preemption barrier. When switching costs are high, competitors must indemnify any newly won customers for the cost of switching. As I put it above, competitors must be that much better than the leader, where *that much* is determined by the magnitude of the switching costs.

The set of three questions offered above should provide the innovator (or any follower who is using this analysis as a diagnostic tool to study the leader's IT-dependent strategic initiative) with an idea of how defendable its initiative is and what are the available options to improve its barriers to erosion. No initiative is static, though, and barriers to erosion decay over time as competition runs its course. As a consequence, managers should ask the folowign question to complete the analysis.

(4) *What evolutionary paths does the innovation create?* Sheltered by its lead time, the innovator can and should seek ways to reinforce its barriers to erosion. Based on their understanding of the organizational learning and asset-stock-accumulation processes described before, the leading firm's managers can chart an evolutionary path for the initiative. While the evolutionary paths thus identified must be revised as the situation changes, this analysis can highlight important response-lag drivers that can be strengthened over time. Performing this analysis will also ensure that the evolution of the initiative is intentional rather than haphazard and minimizes the likelihood that opportunities will be missed.

Consider for example the case of CRM in modern hotels. Because of the nature of the lodging service, where guests often volunteer preference and personal information, many hotels have assembled vast databases of guests' needs and likes. Yet until recently the value

of guest data for analyses (such as customer lifetime-value analysis) was not recognized by managers (cynics may suggest that it still largely isn't). A careful analysis of guest-reward initiatives may have shown that the substantial information repositories which accumulated as a byproduct of the initiative are subject to asset-stock accumulation. Thus, the firm that collects these data in useable form has a strong basis for sustainability in future strategies that use it.

Conclusion

The framework provided here should prove useful to hospitality managers in supporting a careful analysis of IT-dependent strategic initiatives. Since it is difficult to find guidelines for any but a simplistic analysis of the strategic role of IT, I hope that this report will offer a starting point. Even though these guidelines are a simplification of reality, as is true of any framework, I believe that when used by a talented and attentive manager, they can provide useful insights. On the basis of those insights, managers are best positioned to decide whether to go forward with a proposed initiative or shelve it for future reevaluation. The following are three possible broad outcomes from the analysis:

(1) **Develop the IT-dependent strategic initiative independently.** Independent development is warranted if the analysis suggests that strong barriers to erosion exist and the firm foresees the ability to appropriate the value created by the initiative over the long term (i.e., sustainable advantage can be attained). Independent development is also warranted if the leader can reap an acceptable return on its innovation, even though the analysis shows that competitors will eventually be able to overcome the barriers to erosion.

Note that the determination of whether the technology at the core of the initiative should be developed in a proprietary manner will depend on the role that the response lags associated with it (i.e., the IT Project Barrier) play in the sustainability of the advantage.

(2) **Develop the IT-dependent strategic initiative as part of a consortium.** When the initiative is unlikely to yield sustainable competitive advantage for the innovator, but, even after replication by competitors, it will improve the overall profitability of the industry, the firm should attempt to create a joint venture with competitors or engage them in a consortium. THISCO, the reservation switch, represents an early and rare example of this type of development by competitors in the hospitality industry. In this scenario, the leader should strive to minimize costs and risks associated with the initiative and share them with competitors since all will benefit.

(3) **Shelve the IT-dependent strategic initiative.** When the analysis suggests that the initiative will not offer strong barriers to erosion, and retaliation by competitors will degrade the average profitability of the industry (e.g., any value created is driven to customers by competition), the firm should shelve the proposed initiative. If the firm does go ahead with the initiative the likely outcome is competitors' imitation and the creation of value that will be appropriated by customers. For these types of initiatives, the firm should refrain from being the innovator and instead plan to follow only when strictly necessary.[16] ◆

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[16] Because of the fast-declining costs of IT and IT implementations, being a follower with non-sustainable innovations enables the firm to replicate the leader's initiative at a much lower cost.
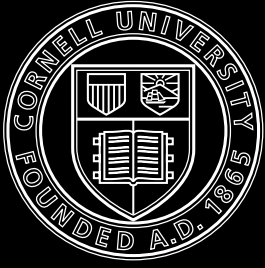
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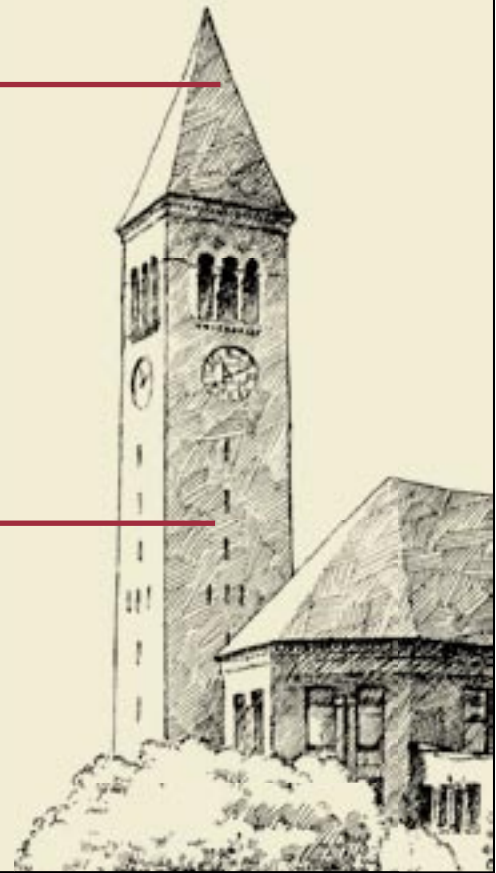
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