

How information technology influences strategy

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## Abstract

The power of information technology has grown tremendously in the last fifty years and has evolved from being just a support function to a major part of the organization itself. More and more, strategy-makers have incorporated information technology into the organization's overall strategic vision. The purpose of this paper is to establish information technology as a vital part of organizational strategy and to describe methods of achieving information technology and strategy alignment. Four trends that affect alignment will be examined along with the necessary characteristics for the information technology savvy leader. How public agencies can adopt alignment into their organizations will then be discussed. It will be demonstrated that organizations that strive for alignment will be more successful than organizations that still view information technology as merely a support function.

### How information technology influences strategy

Starting in the 1960's, information technology has played an increasingly important role in the business sector, the non-profit sector, and the government sector. At first, computers performed only specialized accounting roles but, as the technology improved and with the advent of computer networking, every business function had become at least partially computerized. Information technology also began moving up the management structure starting in the 1980's when computerized spreadsheets helped fuel the numerous merger-and-acquisitions in that decade. With the commercialization of the Internet in the 1990s, companies could not work without their email systems and intranets. The Internet also helped create the virtual firm – a business that had little or no physical infrastructure and depended mainly on its website to service customers and conduct business operations. Very few modern businesses operate without some form of information technology.

Recognizing the increasingly important role of information technology, many business and government leaders are formulating strategies that rely heavily on information technology for executing the strategies. In fact, some of these strategies would not have existed before the advent of information technology. But just how important is information technology to strategy? Also, what comes first; strategy or the information technology? In answering these questions, it will be shown that information technology is important to strategy and that it is imperative to align strategic goals with information technology considerations. Then, four current trends will be analyzed for their impact on alignment. Leadership competencies necessary for successfully aligning strategy and information technology will also be examined. Finally, consideration will be given to how public administrators can best align strategy and information technology.

Information technology plays an important role in the success of a strategy and that success rests on a good alignment between strategic goals and information technology.

*Is information technology important to strategy?*

Nitin Nohria, William Joyce, and Bruce Roberson conducted a five-year study, the "Evergreen Project", to determine what essential management practices make a business successful. After studying the performance records of 160 companies from 1986 to 1996, the authors determined that there are four primary practices and two secondary practices that every business needs to excel. (2003, p. 43) The first two primary practices are strategy and execution. (p. 45) A successful strategy, according to the authors, is consistent and has a "simple, focused value proposition." (p.45) Equally important to strategy is how well the company executes the strategy. As the authors found, information technology plays an important role in execution as long as it lowers cost or boosts output. (p. 46) It did not matter what particular information technology was in place as long as it enabled the company constantly improve key processes. (p.46) Thus, there is strong empirical evidence that information technology plays an important role in at least executing strategy.

In another study that examined 180 business initiatives in 118 businesses from 1990 to 2001, it was found that information technology helps a company establish strategic agility. (Weill, Subramani, & Broadbent, 2002) Strategic agility refers to the company's ability to utilize its existing information technology infrastructure to successfully complete its strategic goals (or "business initiatives" as the authors refer to them). (p.57) Over-investing in information technology leads to waste but under-investment severely restricts the capacity for executing strategy. (p. 57) Based on the findings, the information technology infrastructure can be

categorized into seventy services arranged into ten clusters that taken together aids the company in executing strategic goals.

Although none of the enterprises we evaluated had all 70 services we've identified, those with the highest degree of strategic agility had more services in each of the 10 clusters, broader implementation of each service and more demanding service-level agreements. (p. 61)

Again another empirical study demonstrates how important information technology is to executing strategic goals.

How exactly does information technology help to execute strategy? According to Professor Dien D. Phan from the University of Vermont, information technology "has established a new value chain that links the core business with sales and the supply chain." (2001, p. 63) As Dr. Phan argues in his article, information technology allows for constant innovation in reaching new customers and gaining better service from suppliers. (p. 63) This view is supported by Shaker Zahra and Gerard George's research on the net-enabled business innovation cycle. Quoting Straub and Watson, Zahra and George assert that "[n]et-enabled organizations are likely to be more agile and capable of competing in dynamic markets than other organizational forms." (as cited in Zahra & George, 2002, p. 147) Again, the key to this strategic agility lies in improved processes that enable a company to better execute strategy. (p. 149) It should be noted that, while agreeing in part with the net-enabled business innovation cycle theory, Zahra and George stress the need for more empirical research to determine exactly how value is created from the interplay between information technology and strategy.

One possible solution to Zahra and George's question on value creation is how information technology provides real-time data to strategy makers. According to David Menninger, timely information is critical in allowing executives to make "faster and better forward-looking decisions." (2003, p. 50) More and more organizations are turning to business

intelligence systems so that they can observe how their strategies perform by monitoring key performance indicators. Before information technology, businesses would create annual plans and budgets, wait a year (at least), and then examine how well the targets were met. This resulted in major waste and inefficiency as unforeseen events forced companies off their plans. Now, in the highly-accelerated marketplace, businesses can quickly change strategies when the unexpected happens. (p. 52)

But, whatever the reason why information technology is necessary for executing strategic goals, it has been established that information technology is vital and must be considered when formulating strategy. As will be discussed in later sections, aligning strategic goals with the information technology infrastructure is necessary to achieve optimum business benefits. Bruce Karin lists a number of key components that need to be coordinated with strategic objectives with information technology being one of the more important components. (1998, p. 16) Failure to properly align information technology and strategy can be disastrous.

The cost to the business is that the enterprise will miss strategic opportunities to expand markets, innovate new products, capture new distribution channels, and leverage customer assets. It may also miss tactical opportunities to increase productivity, increase profitability, understand and control costs, and increase speed and responsiveness. Worse yet, a firm may discover – as one athletic shoe company did – that 75 percent of its IT budget was being spent on administrative projects, even though the company's growth depended upon its scientific and technical capabilities. (p. 18)

This is why it is important for organizations to align their information technology and strategy.

But, before discussing alignment methods, it is necessary to examine dissenting views on the link between information technology and strategy. In the next section, two significant *Harvard Business Review* articles that are critical of the role information technology plays in strategy.

*Two dissenting views on information technology's importance to strategy*

Dr. Michael Porter is considered the foremost authority on business strategy and is the creator of the "Five Forces Model" for analyzing business competition. In the March 2001 issue of the *Harvard Business Review*, Dr. Porter analyzed the impact of the Internet on strategy. He dismisses the claim that the Internet makes strategy obsolete and argues that "pure play" companies (companies that exist only on the Internet) will eventually fail because of a lack of strategy. (2001, p. 72) Considering that the article came out soon after the dot-com bubble burst, this seems to validate Dr. Porter's claims. But it is important to understand all of Dr. Porter's arguments in order to discover that he actually agrees that information technology is complementary to strategy. (p. 64)

The key tenet advanced by Dr. Porter is that the Internet has a leveling effect. "It [Internet] tends to alter industry structures in ways that dampen overall profitability, and it has a leveling effect on business practices, reducing the ability of any company to establish an operational advantage that can be sustained." (2001, p. 64) Using the Five Forces Model, Dr. Porter demonstrates that for every benefit the Internet provides, there is a corresponding negative that cancels it out. Thus, the Internet creates a "profit paradox" - by making transactions easier to perform and manage, the Internet also makes it harder "to capture those benefits as profits." (p. 66) Essentially, Dr. Porter argues, there is no real benefit from abandoning strategy in favor of the alleged benefits of the Internet. (p. 72)

To further bolster his argument, Dr. Porter examines the widely-held belief that being the first-mover on the Internet gives a major competitive advantage. Dr. Porter gives five arguments against the first-mover advantage. First, because of the low switching costs inherent in the Internet makes it quite easy for customers to shift loyalties. Therefore, even if a company is

first on the Internet, once a better competitor shows up, there is very little cost for the customer to switch. (2001, p. 68) Second, because of the open nature of the Internet technology standards, there is no network advantage that a first mover can use to lock-in customers. (p. 68) Third, branding is very difficult on the Internet because of the virtual nature of Internet companies make their products less tangible to consumers. (p. 69) Fourth, complements (products and services that are used in tandem with each other) are less stable because it tends to increase rivalry and thus profits are driven down. (p. 69) Fifth, many virtual companies use outsourcing to achieve profitability. But, as more companies turn to outsourcing, products become homogeneous and price competition increases. In addition, companies lose control over key parts of their business due to outsourcing. (p.69) Thus, Dr. Porter establishes that relying purely on the Internet will gain no benefit for the organization.

But, Dr. Porter also argues that by integrating the Internet with traditional competitive strategies, organizations "should win in many industries." (2001, p. 78) As he observes, customers "will value a combination of on-line services, personal services, and physical locations over stand-alone Web distribution" (p. 78) while "on the supply side, production and procurement will be more effective if they involve a combination of Internet and traditional methods, tailored to strategy." (p. 78) As he concludes the article, Dr. Porter agrees that this "powerful new technology [will] become an equally powerful force for competitive advantage." (p.78)

Whereas Dr. Porter only examined the Internet as it relates to business strategy, Nicholas Carr, *Harvard Business Review's* Editor-at-Large, argues that all information technology's strategic importance has diminished. In his controversial article, Mr. Carr states that the strategic

power of information technology has diminished as it becomes more ubiquitous. (2003, p. 42)

According to his view of strategy, it is scarcity that imparts strategic importance.

What makes a resource truly strategic – what gives it the capacity to be the basis for a sustained competitive advantage – is not ubiquity but scarcity. You only gain an edge over rivals by having or doing something that they can't have or do. (p. 42)

Essentially, information technology has become just another cost of doing business and its widespread use has commoditized it. (p. 42)

Before Mr. Carr establishes his claims that information technology has become a commodity, he distinguishes between proprietary technology and infrastructural technology. Proprietary technology is owned by one company and is protected by intellectual property devices such as patents and trademarks. "As long as they remain protected, proprietary technologies can be the foundations for long-term strategic advantages." (2003, p. 42) In contrast, infrastructural technologies are shared technologies like the railroads or the Internet. "The characteristics and economics of infrastructural technologies, whether railroads or telegraph lines or power generators, make it inevitable that they will be broadly shared – that they will become part of the general business infrastructure." (p. 42) Unlike the proprietary technologies, the window of strategic opportunity for infrastructural technologies is very short and occurs toward the early history of that technology. (p. 43)

After distinguishing between the two different technologies, Mr. Carr then explains why information technology is now a commodity. First, infrastructural technologies are essentially transport mechanisms in that it carries electronic information much like the railroads carried freight and passengers. (2003, p. 44) Second, information technology has made data, software, and business processes highly replicable. As more companies move toward grid computing and

the use of web services, software and business processes will become even more homogeneous.

(p. 44) Third, information technology is subject to rapid price deflation. (p. 45)

To further bolster his commoditization argument, Mr. Carr compares the rapid growth of capacity of the Internet to how rapidly the railroads and electric power utilities added capacity. In all three technologies, the increasing capacity curves are very similar. (p. 46) In addition to increasing capacity, the author also points to best practices being routinely built into the software as another example of commoditization. (p. 47) Taken all together, the author argues that the "buildout" of information technology is close.

According to Mr. Carr, five signs point to an information technology buildout. The first sign is that information technology's "power is outstripping most of the business needs it fulfills." (2003, p. 47) Price deflation to the point where information technology is widely available is the second sign. (p. 47) The third sign is that capacity has caught up with demand and the fourth sign is that vendors now push information technology as a commodity. (p. 47) The fifth and final sign is the bursting of the investment bubble as investors realize they will no longer enjoy substantial profits from information technology. (p. 47)

In light of the buildout, Mr. Carr suggests three strategy implications concerning information technology that are essentially "spend less" (2003, p. 48), "follow, don't lead" (p. 48), and "focus on vulnerabilities, not opportunities." (p. 48) As Mr. Carr concludes, "[information technology] management should, frankly, become boring. The key to success . . . is no longer to seek advantage aggressively but to manage costs and risks meticulously." (p. 48) Thus, according to Mr. Carr, information technology is no longer a strategic consideration and plays only a minor role in executing strategic goals.

Mr. Carr does raise some good points about possibility of an information technology buildout but his distinction between proprietary and infrastructural technologies still allows for a strategic advantage by information technology. As the nature of proprietary technology implies, businesses can realize major strategic advantage from the information technology even if part of that technology uses some part of infrastructural technology. For example, the Google search engine exists wholly on the Internet (infrastructural technology) and uses commonly available computer hardware and programming languages to host its database and provide a web interface. Even so, the Google company enjoys a major strategic advantage based on its proprietary search algorithm and highly-efficient methods to rapidly produce search results. In another example, two investing firms can use the same Microsoft Office suite, online access to the same stock databases, and provide customer access through similarly-designed website. Despite the identical information technology infrastructures and applications, one firm can program a better Microsoft Excel spreadsheet model and thus realize a greater strategic advantage over its competitor. Despite Mr. Carr's thesis, an organization can realize a substantial strategic advantage in the innovative configuration of the information technology components even if the components are universal to all organizations.

In examining these two dissenting views, it is realized that information technology can still play a major role in executing strategy. As Dr. Porter wrote in his article, the Internet can complement strategy and the firms that combine the Internet with traditional competitive strategies will fare better than competitors who use only traditional competitive strategies. And even Mr. Carr admits that proprietary technologies can give organizations a major strategic advantage. Thus having reestablished the importance of information technology in strategy

execution, the next section details the challenges of aligning information technology and strategy.

*The challenge of aligning information technology and strategy*

As Professor Prahalad and Professor Krishnan discovered, after consulting with 500 senior executives over a four-year period, there is deep gap between information technology and strategy. (2002, p. 24) Even at companies known for their “competitive and technical savvy, the gap between emerging strategic direction and IT’s ability to support it is significant and debilitating.” (p. 24) The authors find that this gap results from both a legacy infrastructure and dissimilar goals between the information technology department and other departments. (p. 25) Other departments view information technology as merely support and that packaged solutions were the best way to control costs and keep the infrastructure running smoothly. (p. 25) As they state, this “thinking locked companies into rigid enterprise-application software only to have them realize that their business practices and processes did not fit a vendor-designed package.” (p. 25) Thus, they recommend adopting an “applications-portfolio scorecard” (p. 30) to bring information technology managers together with other senior management to discuss common goals and determine how the information technology infrastructure will impact strategy and vice-versa. (p. 31)

Hirschheim and Sabherwal also found a deep gap between information technology and strategy. They start by giving three central arguments about information technology and strategic alignment. First, performance is related to “attaining the appropriate structure and capabilities to execute its [the organization’s] strategic decisions.” (Hirschheim & Sabherwal, 2001, p. 87). Second, information technology influences strategy. (p. 87) And third, strategic

alignment is a continuing process. (p. 87). Because alignment is a continuing process, it suffers from “three problematic trajectories.” (p. 88). “Organizations sometimes make a decision that actually takes them out of alignment (paradoxical decision), go too far in certain respects (excessive transformation), or reverse a change and go back to the original position (uncertain turnaround).” (p. 88)

Before discussing the three trajectories, the authors first detail a popular typology of business strategies: “Defenders”, “Prospectors”, and “Analyzers”.

The Defender is the most stable of the three. It seals off a stable and predictable but narrow niche in its industry by offering high quality products or services at low prices. The Prospector continuously seeks new opportunities and is the creator of change in its market. Combining the strengths of the Defender and the Prospector, the Analyzer seeks to simultaneously minimize risk while maximizing opportunities for growth. (Hirschheim & Sabherwal, 2001, pp. 88-89)

They then discuss the three dimensions of information technology strategy: “*role* [italics in original] (efficient, comprehensive, opportunistic)” (p. 89); “*sourcing arrangement* [italics in original] (outsourcing, selective sourcing, insourcing)” (p. 89); and “*structure* [italics in original] (centralized, shared, decentralized)” (p. 89). By combining the three business strategies with the three information technology strategies, the authors developed three “Strategic IS Alignment Profiles.” (p. 90)

The first profile, “Utility,” is characterized by using information technology to “provide technical expertise and coordinate outsourced low-cost solutions to support the organization’s primary business.” (p. 90) In the second profile, “Alliance,” the information technology department assists the “organization in forming alliances with other businesses.” (p. 91) The “Infusion” profile is where the information technology department is charged with the “delivery of innovative IT products and services that support and sustain business opportunities.” (p. 91) Whichever profile is chosen, the authors argue that “incrementalism” (“changing one or more of

the four components of strategic IS alignment in one direction, then changing some other components, and occasionally undoing recent changes” (p. 91)) is the cause of strategic misalignment along one or more of the problematic trajectories. Accordingly, they advise managers to carefully consider how their information technology strategies interlock with their business strategies so as to avoid creating a potential problem. Again, it is a matter of having the information technology department and the other departments create a common vision and shared goals.

A five-year empirical study of 500 firms representing 15 industries supports the existence of an information technology and strategy gap. According to Luftman and Brier, there are six enablers of alignment and, correspondingly, six inhibitors. (1999, p. 109) These enablers and inhibitors are remarkably similar to findings in the previous two studies discussed in that a leadership, shared goals, and working together are important for alignment. (p. 109) The authors also propose a framework for information technology and strategy alignment.

Consisting of twelve components organized into four areas, this framework ties the information technology infrastructure into strategy. In the first area, “Business Strategy”, the components are “business scope”, “distinctive competencies”, and “business governance”. (Luftman & Brier, 1999, p. 111) The second area, “Organization Infrastructure and Processes”, consists of “administrative structure”, “processes”, and “skills”. (p. 111) In the third area, “IT Strategy”, there is “technology scope”, “systemic competencies”, and “IT governance”. (p. 111) Finally, “architecture”, “processes”, and “skills” make up the fourth area of “IT Infrastructure and Process”. (p. 111) As can be observed, the first two areas (that correspond to the business as a whole) closely parallel the second two areas (that correspond to the information technology

department). Thus it appears that the authors are implying that the information technology infrastructure must mirror the business as a whole in order for optimum strategic alignment.

The authors conclude by establishing a six-step process for strategic alignment. The steps are:

1. "Set the goals and establish a team." (Luftman & Brier, 1999, p. 115)
2. "Understand the business-IT linkage." (p. 115)
3. "Analyze and prioritize gaps." (p. 115)
4. "Specify the actions (project management)." (p. 115)
5. "Choose and evaluate success criteria." (p. 115)
6. "Sustain alignment." (p. 115)

By following this process, the authors assert that the organization will "maximize alignment enablers and minimize inhibitors." (p. 115)

Consultants Say, Fusfeld, and Parish also propose a process for achieving strategic alignment. They propose 50-item tool broken into ten alignment dimensions that is used to open up a dialogue between the information technology management and senior management. (Say, Fusfeld, & Parish, 2003. p. 33) Despite its size and detail, this tool has a great deal in common with the previous tools and frameworks in terms of organizational goals and the maturity of the information technology infrastructure. Its ultimate goal, as with the other tools, is to close the gap between information technology and strategy. (p. 33)

Having established that there is an information technology and strategy gap and having examined possible reasons for this gap, the next section details some methods for information technology and strategic alignment. Some methods have already been examined in this section

but the following methods differ in that they go beyond in just achieving alignment to a closer coupling of information technology to strategy.

*Going beyond aligning information technology and strategy*

“Currently, we are in transition, both cyclically and in the perceptions of IT , “ state Kulatilaka and Venkatraman. (2001, p. 7) It is their thesis that the “drivers of business value will be based on exploiting the developments in information technology.” (p. 7) They also see information technology and strategy as critical to organizational success but they do not make the clear distinction between the information technology department and the rest of the organization. The authors say that companies need to blend information technology and strategy into a tool – the “Strategic Options Navigator.” (p. 12) The Strategic Options Navigator is a three-stage tool that helps an organization to determine strategic opportunities and aids in achieving them. In the first stage, a company will assess opportunities and acquire options. (p. 12) At this point, a company is surveying its environment for new market possibilities. In the second stage of the Navigator, the company transitions from acquiring options to nurturing selected options. (p. 12) At this point, the information technology infrastructure begins to play an important role as support for the nurturing process. This is also the stage where companies began to create strategic information technology products and services to give them a competitive edge.(p. 13) In the final stage, the company goes from nurturing options to capturing value from their options. Again, information technology plays a key role as firms decide to continue with “follow-on investments“, “abandon projects”, or introduce “complementary initiatives”. (p. 13) In following the Strategic Options Navigator, organizations are encouraged to blend information technology into their overall strategy.

Consultants Van Der Zee and De Jong modifying an existing business management tool to blend information technology and strategy. As they state, “IT is virtually interwoven with almost every aspect of modern organizations, their business network, and their environment as a whole.” (Van Der Zee & De Jong, 1999, p. 138) Thus the authors suggest incorporating information technology strategic goals into a company’s Balanced Scorecard. First developed by Kaplan and Norton, the Balanced Scorecard presents managers with “a set of measures that gives top managers a fast but comprehensive view of the business.” (as cited in Van Der Zee & De Jong, 1999, p. 139) The Balanced Scorecard builds an organization’s strategy around four perspectives: “customer” (p. 140), “financial” (p. 140), “business process” (p. 140), and “organizational learning” (p. 140). Since its creation in 1991, the Balanced Scorecard has become a popular management for developing and monitoring business strategy.

Because of the popularity of the Balanced Scorecard, Van Der Zee and De Jong argue that both business goals and information technology need to be integrated into the Balanced Scorecard for two reasons. The first reason is that business management and information technology management “can use the same ‘performance measurement’ language, thereby integrating IT planning processes.” (Van Der Zee & De Jong, 1999, p. 144) The second reason is that “[i]ntegrating the business and IT management processes eliminates, or at least considerably reduces, the time lag between the two.” (p. 144) But the authors also warn that by itself, the Balanced Scorecard will not automatically integrate business and information technology management. “The integration sought will only result when the willingness and culture exist for business managers to share information about the business planning and for IT managers to share parts of their former authority.” (p. 154)\

As was demonstrated in both this section and the previous section, organizations realize that a gap exists between information technology and strategy and that alignment is necessary for organizations to realize the optimum strategic benefits from their information technology investments. Eventually alignment leads to a blending of information technology and strategy to the point that one cannot separate them. In the next section, four issues will be examined that have a major impact on alignment.

*Four information technology and strategy issues that affect alignment*

Along with alignment, organizations should consider other issues that touch on the relationship between information technology and strategy. Four important issues are the increasing trend toward decentralization, the growing popularity of web services, the constant need for information technology innovation, and the evolving sophistication of website architecture. Each issue will be examined in turn and its impact on information technology and strategy alignment will be discussed.

The first issue, decentralization, started in the 1980's but has greatly accelerated in the last few years. As Kahai, Carr, and Snyder state, "[o]ver the past three decades, the information systems (IS) function in organizations has evolved from being merely a support function in the organization to one that allows business to be conducted in a way that was not possible before." (2003, p. 51) During this evolution, information technology has also become more decentralized as individual desktop and laptop computers have become more powerful and network technologies have become more flexible. (p. 52) Because the "current business is rather dynamic", organizations must be "able to respond swiftly to changes in the environment." (p. 59) Rather than one centralized department, organizations are creating "centers of excellence" that

provide the necessary decentralization but also ensures that there is a sufficient number of trained information technology personnel. (p. 59) Additional advantages to decentralization are greater security and more robust network. (p. 59) This decentralization trend increases the work on strategy makers as they now have to include more parties into the strategy-formulation process thus making alignment much complex and riskier.

Turning to the second issue, as companies are beginning to break-up and decentralize their data and information technology silos, the need for applications that can be configured quickly to respond to the changing business environment are desperately needed. Many companies that are faced with hundreds of incompatible systems have turned to "enterprise resource planning (ERP)" systems to tie all these systems together. But this solution just replaces one problem with another as Hagel and Brown point out. "In effect, the companies that have installed ERP systems have replaced their fragmented unit silos with more integrated but nonetheless restrictive enterprise silos." (2001, p. 106) What is needed is an architecture that is open, configurable, and immediately created – web services. The key to web services is that "applications [can] connect freely to other applications and [can] read electronic messages from them." (p. 106) Four advantages to this capability is that companies only need to purchase the functions they need; all application maintenance is outsourced; companies are not stuck with obsolete applications; and more flexible collaboration between applications. (pp. 108-109) Thus, many organizations are adopting web services as the core of their information technology strategy.

Web services also increases the complexity of alignment because they are essentially an outsourcing of some or most of the information technology department's functions and may stifle internal information technology innovation. Instead of devising unique and potentially profitable

proprietary information technology solutions, organizations are more likely to cobble together a passable solution from a collection of web services. And even if a company creates a unique web service, its openness can easily be co-opted by competitors. Web services are essentially another form of outsourcing and thus have the inherent risks that accompany any outsourcing of an organization's functions.

The third issue concerns the constant need to innovate information technology applications and infrastructures. In examining "interorganizational systems," Siau describes an information technology infrastructure as that which "empowers companies to compete in a totally new dimension." (2003, p. 33) An interorganizational system "changes the structure of the industry and alters the rules of competition" (p. 33), "creates competitive advantages" (p. 33), and "spawns whole new business" (p. 33). But this strategic advantage can quickly be nullified by a competitor, a "late adopter," who adopts the innovator's interorganizational system. According to Siau, the only solution to this dilemma is for the innovator to continually innovate their interorganizational system to maintain their strategic advantage. (p. 36)

The challenge to alignment is clear. Constant innovation of information technology infrastructure will cause strategies based on the functions of the previous technology to fail. Strategies that are based on future information technology functions may also fail if the new information technology infrastructure is not installed properly or does not meet expectations. Because of the constant turmoil, strategy makers will either create strategies that do not rely on specific information technology functions and thus nullify the advantages of that innovative technology or will constantly revise the strategy that will increase the risk of failure.

The fourth issue is not as problematic as the first three but must be an important consideration when aligning information technology and strategy. The website has become the

primary interface between the organization, its customers, and its suppliers. A certain level of sophistication and interactivity is expected. In order to achieve this level, Huizingh proposes three models to aid in developing websites. The first is the "Strategic Internet Applications Model" that aids in exploring four strategic choices: "to use the Internet to offer customized products or services, to provide added value to current customers, to attract new customers, or to reposition the company in its business network." (Huizingh, 2002, p. 727) The second model, the "Customer Interaction Cycle," describes how customers interact with a website and how to build a successful customer relationship. (p. 731) The "ADOF Model" is the third model and it measures the success of a website based on four characteristics: accessibility, design, offer, and fulfillment. (p. 737) Huizingh suggests using the Strategic Internet Applications Model to determine the main objectives of the site and to use the Customer Interaction Cycle as a way of viewing the website from the customer's perspective. (p. 741) Using the inputs from the first two models, the organization uses the final model to create the design of the web site. (p. 742) These models closely resemble the earlier alignment tools but add a customer perspective to the strategy-making process.

These four issues indicate that strategic alignment is a complicated and changing process that reflects the changing internal and external environments of organizations. An effective strategy requires being able to accurately assess and predict outcomes from the strategic actions. Obviously, the more predictable these environments are, the easier it is to formulate strategy. But as the above issues demonstrate, information technology is rapidly changing and requires constant change to remain strategic. Trying to align information technology and strategy for optimum benefit is much like trying to shoot at a rapidly-moving target. It requires strategy-makers who can aim at where the strategic advantage will be in the future while determining

what current resources and future resources can help reach the strategic target. It is also imperative that information technology managers and senior management be able to communicate their goals and needs in a common language. Thus, the next section will examine the competencies that are needed by strategy leaders so that can most effectively bring about alignment.

*Leadership competencies for information technology and strategy*

By now the vast array of Web applications for supply-chain integration, customer relationship management, salesforce automation, work group collaboration – and the sale of everything from equities to automobiles – should make it perfectly clear that information technology has evolved beyond the role of mere infrastructure in support of business strategy. In more and more industries today, IT *is* [italics in original] the business strategy. (Earl & Feeny, 2000, p. 11)

Earl and Feeny state that "strategy and IT have become so intertwined that large corporate IT failures frequently lead to the demise of the CEO." (Earl & Feeny, 2000, p. 12) As they have found, few senior managers understand information technology and thus cannot provide the necessary leadership for aligning strategy and information technology. (p. 12) Based on their research and consulting experience, the authors have created seven archetypes that detail an executive's fitness (or lack of) concerning information technology.

The first archetype is the "Hyprocite" who "claims to believe that IT is strategic but he [or she] demonstrates the opposite by his actions." (Earl & Feeny, 2000, p. 12) Second is the "Waverer" who "reluctantly accepts the importance of IT in business development and survival but will not make it a personal priority." (p. 12) The "Atheist," the third archetype, is so called because he or she "downplays IT as a strategic resource but publicly opposes contrary beliefs." (p.12) In contrast, the fourth archetype, the "Zealot," becomes a convert to the power of information technology but holds such a dogmatic and narrow view that he or she will not

consider other opinions on information technology. (p. 12) The fifth archetype, "Agnostic," concedes "IT may be important but not prepared to back his [or her] instinct in the absence of a 'watertight' business case." (p. 13) The sixth archetype, "Monarch," completes the collection of executives who are unfit in properly managing information technology. The Monarch believes that information technology is important but prefers to delegate information technology management issues to a subordinate. (p. 13)

The "Believer" is the seventh archetype and this is executive that Earl and Feeny judge to be fit for aligning information technology and strategy. (2000, p. 13) This is because the executive "*believes* [italics in original] . . . the business value of IT" (p. 13), "*live* [italics in original] their faith every day" (p. 13), and "*practice* [italics in original] what they preach." (p. 13) Executives that believe in information technology see it as way of "doing business differently . . . rather than thinking strategy first and technology second." (p. 15) They live this belief in several ways by creating a "positive hunger for change" (p. 16), setting clear and lasting business focus (p. 16), publicly expresses their belief (p. 16), self-educates themselves on information technology issues (p. 17), and is constantly working closely with their information technology managers (p. 17). And they practice their belief by continuous learning on information technology (p. 18), visioning an information technology future (p. 19), "sponsoring internal and external IT architecture" (p. 20), embeds information technology into the business (p. 21), and keeps up the pace of information technology innovation in the organization. (p. 21)

Examining the above characteristics, it can be shown how the leadership competencies fit well into the necessary conditions for strategic alignment. First, the executive is predisposed to considering information technology as necessary strategy. Second, the continuous learning and self-education helps the executive to understand the information technology managers'

perspective and speak their language. This is how the executive can communicate their vision to both the information technology department and other departments with equal clarity. Third, by creating the "positive hunger for change" (Earl & Feeny, 2000, p. 16) and pressing for constant innovation, the executive maintains the strategic advantage of the organization's information technology. Fourth, because of the executives' constant expression of their support and confidence in information technology, other managers are persuaded to align information technology and strategy. Earl and Feeny demonstrate that successful alignment is dependent on certain leadership competencies as much as the organizational culture and structure and the innovativeness of the information technology infrastructure.

The previous sections answered the question of information technology is important to strategy, how to best align information technology and strategy, and the leadership competencies necessary for successful alignment. The next section will examine issues specific to public agencies as they strive toward aligning information technology and strategy.

#### *Information technology and strategy alignment in public administration*

"Corporate strategic planning does not come naturally to organizations within the U.S. federal government," declares Campbell in his article that examines long-range strategic planning in the U.S. Air Force. (2002, p. 427) He bases this on two arguments. The legislative branch is not capable of conceiving and sustaining a long-range vision due to constant turnover in members is the first reason. (p. 427) The second reason is that the internal departments in an agency have competing self-interests that prevent agreement on a long-range strategy. (p. 428) The only examples of successful long-range strategy planning and execution are the

"skunkworks" that benefit from being "far from central offices, operating without a clear mandate from above [sic] and using bootlegged resources." (p. 429)

To examine why this is at least true for the Air Force, Campbell outlines five key factors for strategic innovation. Campbell first suggests that instead of focusing on strategic planning, agencies should perform metaplanning. Metaplanning is advised because of the difficulties "in discerning the future public good and immense uncertainty about the degree to which stakeholders will align behind stated goals." (Campbell, 2002, p. 430) Using metaplanning, the agency only needs to anticipate "environmental change that will challenge them beyond the capabilities provided by the status quo" (p. 430) and that agencies reject incrementalism (p. 430) which are factors two and three. A fourth factor is the scenario building and war-gaming in order to test out the possible strategies (p. 431) while the fifth factor is strong leadership. (p. 432) Even though this is not listed as a factor, Campbell also discusses the importance of keeping stakeholders fully informed. (p. 434) After listing these key factors, Campbell then advises agencies on the practical aspects of implementing strategic planning.

The first step is for agencies to determine how far in the future to vision. The trick is to vision far enough to provide useful goals but not too far as to make the vision unbelievable. (Campbell, 2002, p. 450) Closely related to the first step is to use war gaming as a means to open up a dialogue between agency managers on the future vision.

First, agencies actually can pull themselves out of cognitive ruts – for instance, an overemphasis on threats – by adopting more open-ended and dialogical views of how to relate scenarios and demands. Second, agencies that pursue future gaming notwithstanding the unavailability of overscheduled top leaders can reap the benefits of consciousness-raising below the top management echelon and increased systematic input for senior decision-makers. (Campbell, 2002, pp. 450-451)

The third step is foster collegial leadership (p. 451) and the fourth step is to create a supportive structure. (p. 451) The fifth step is familiar one as Campbell again advises keeping stakeholders fully informed. (p. 452)

Although metaplanning is less rigorous than strategic planning and the information technology and strategy alignment will not be as optimal, these steps closely parallel what has been discussed in previous sections. Both rely on a clear and focused strategy that is communicated to all management in a common language. And leadership is a key in both alignment and metaplanning.

### *Conclusion*

To be successful, an organization must have several processes that work effectively together so that the organization can realize maximum benefits from their infrastructure. Accounting systems must track and forecast revenue streams accurately; human resources must have training systems in place to supply a steady stream of highly-skilled employees; the supply chain must be efficient and timely; and even the physical layout can have a significant impact on operations. All these support functions are necessary in helping the organization function but it is strategy that makes an organization grow and become successful. Some would classify information technology as just another support function but, as has been shown in this paper, information technology goes beyond mere support to a vital part of the strategy-making process. At the very least, organizations must learn to align their information technology goals with their strategic goals to achieve both.

To further bolster the importance of information technology in strategy, the views of two major critics were examined. Upon first reading their arguments, it appears that information

technology plays no more than a supporting role at best and may be rapidly losing its strategic importance. Further analysis reveals just the opposite as Porter admits the Internet allied with traditional strategic methods is superior to organizations using only traditional strategic methods. (Porter, 2001, p. 78) Similarly, Carr's division of information technology into proprietary and infrastructural recognizes the strategic importance of at least some types of information technology. (Carr, 2003, p. 43) Therefore, the importance of information technology in strategy has been reestablished.

Several methods for information technology and strategy alignment were examined and the tools can become quite complex and detailed. But there is a core set of concepts germane to many alignment methods. First, there must be an articulated organizational strategy vision. Second, it is imperative that a dialogue exist between the information technology department and the other departments and that a common language be created so that all have an equal understanding of the strategy. Third, it is important to realize that alignment is a process. Information technology requires constant innovation to maintain its strategic edge. Also, strategy-makers can benefit from receiving real-time feedback to aid them in modifying their strategies for a rapidly-changing environment. Any alignment method or tool should contain these three steps to ensure proper alignment.

Realizing the importance of alignment, some organizations have taken alignment to a higher level by blending information technology and strategy into a single process. Four trends have also contributed to this blending as companies began moving toward decentralizing their information technology architecture, using web services to build application, constantly reinvent their information technology infrastructure, and websites have become more sophisticated.

As companies pursue alignment, leaders who are information technology savvy are becoming increasingly important. It is vital that strategy makers believe, live, and practice the importance of information technology in strategy so that other leaders will share in the strategic vision and keep the dialogue going. Thus, a leader must continually educate themselves on information technology issues and publicly proclaim their support for alignment.

After establishing the importance of information technology in strategy and discussing how to achieve alignment, the particular needs and challenges of public agencies were considered. Because of the uncertainty of the political process, public agencies are encouraged to adopt metaplanning as a less rigorous version of strategic alignment. First, agencies should vision how their particular environment will change in the future. Second, strategy-makers should use shared strategy-planning tools (war gaming and scenario planning) to open up a dialogue between different managers. Third, leadership is also a key factor as is keeping stakeholders fully informed. An additional factor that prevents successful strategic planning is incrementalism which is common in public agencies. Considering that incrementalism is the standard mode of operation in public agencies, further research in how incrementalism affects public strategy making would be a useful question to explore.

Information technology has evolved from its support role to becoming a vital part of an organization's mission. Organizations that realize this and work to achieve alignment will reap tremendous benefits from their investments in information technology and grow successfully.

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