

Strategic Options in the Digital Era

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Strategic Options in the Digital Era

Abstract

The collapse of the dot-com euphoria coupled with the downturn in the business cycle is driving many firms to abandon their high growth strategies in favor of bottom-line current earnings. In this climate there is growing pressure to design, justify, and manage information technology (IT) investments towards short-term profitability. We believe that winning firms must not ignore valuable future business opportunities created by IT. We propose that firms hedge against adverse future conditions but retain an ability to seize the up-side business benefits by using IT to create strategic options.

Framing IT investments as options goes far beyond the justification of the business case. It involves a continued conversations among business, IT and finance executives in assessing opportunities, acquiring options, nurturing those options, and finally, when conditions are ripe, capturing value. We use three illustrative examples to develop a strategic management process that we term as the Strategic Options Navigator. We conclude by drawing a set of implications for the CEO, CIO and CFO of companies striving to win in the digital era.

Introduction

The role of information technology (IT) in business operations is once again under attack: the dot-com failures and the fallout from lofty NASDAQ valuations are compelling companies to rethink the role and position of IT within business operations. Some believe that the failure of so many of the dot-coms so quickly simply validate the veracity of their traditional business models. Some others believe that the role of IT should continue to be cost center and that IT should simply support business strategies.

However, we are in an interesting stage of transition: when we remerge from the current global recession, the drivers of business value will be based on exploiting the developments in information technology—computers, communications, software, analytics and so on. The dot-coms may have failed as a category but the impact of the Net has not disappeared nor slowed down. The digital era has barely begun.

It is natural to focus on generating current earnings to demonstrate viability to the stock market during these uncertain days. In a sluggish economy, such earnings come rarely from increased revenues. As a result reducing costs has become the priority and technology projects are justified mostly for their efficiency improvements or immediate cost savings. This imposes a much-needed discipline, but it may leave many opportunities untapped. We believe that winners must also pursue opportunities offered by technological innovations. Firms that become lean as well as build and nurture growth opportunities will be best positioned for the up turn of the business cycle. They need to simultaneously focus on top-line growth and bottom-line profitability.

As we analyze the moves by companies to win over the last few years, we find that the actions have been piece-meal and ill conceived. Companies embraced the Internet without appropriate consideration of top-line *and* bottom-line indicators of success. Growth was pursued at the expense of profitability. Separate e-divisions were created to spearhead digital initiatives without articulating the actions that they could pursue—which may be in conflict with the traditional operations.

So, how should companies develop their business strategies to win in the digital era? In this article, we argue that winning in this uncertain but potentially exciting digital era requires a careful and coordinated alignment across three domains: business, IT and finance. We see the central role of finance as going beyond the traditional control and gate-keeping role to minimize downside risk. Winning in the digital era requires a new mindset—it is more than simple unsubstantiated principles like 'build fast' or 'growth before profits' or vague articulation of the 'new business models.' Winning requires a fundamental recognition of uncertainty as a potential source of value and the role of finance in aligning business and IT strategies.

We develop our logic by briefly discussing three illustrative cases. We have chosen them not because they are exemplars of the complete logic; indeed, no single case is a complete and perfect illustration. We have chosen them because they highlight some of the core ideas underlying the approach that we propose.

Sidebar: Technology Investments as Options

The colloquial use of the word option connotes a menu of alternative choices. We use options in a more precise way: an option is the right, but not the obligation, to take one of several possible actions at some future date. The choice will be based on the particular realization of specific variable--whose value in the future is uncertain today. Therefore, the value of options increases with greater uncertainty. For example, a call option is a legally binding contract that gives the option buyer the right to buy 100 shares of IBM stock at a \$100 per share on six months from today. On the option expiration date in 6 months, the owner of the option will only choose to exercise it to buy IBM at \$100, if the IBM stock price on that date exceeds the \$100. If the price IBM happens to be below \$100, the option will expire worthless.

Many strategic investments create an ability for firms to invest or divest in subsequent time periods based on how the opportunities unfold. Like stock option above, these strategic investments can provide the firms options on the future market conditions. These options are different from financial options in that they require the purchase, the sale, or restructuring of *non-financial* assets. Since they are typically based on the value of real assets, such options have come to be known as *real options* or *strategic options*. However, such option-like investment opportunities faced by firms in the new economy would invest in intangibles like knowledge, intellectual property, patents, and reputation effects.

The contract terms of a financial option clearly specifies the decision rules in terms of observable market prices and the assigns it holder legal rights to the ensuing payoffs. In contrast, strategic options must first be identified and their market values assessed. The firm must then determine whether to acquire them after comparing with comparable alternatives that may involve contracts or external transactions. The firm must have a capability to carry out the actions needed to exercise the option and appropriate its value.

Those interested to learn more about the underlying principles are referred to:

Martha Amram and Nalin Kulatilaka, *Real Options: Managing Strategic Investment in an Uncertain World*, Harvard Business School Press, 1999.

Several web sites provide comprehensive bibliographies and examples of current applications on real options:

www.real-options.com

www.realoptions.org

Three Illustrative Case Studies

1. GM OnStar—what happens when automobiles have IP addresses?

Lesson: Given uncertainties in the evolution of telematics, GM has adopted a broad stance in how this might impact their operations; specifically, it has sought to rapidly achieve dominant scale and continually enhance the scope of services to the customers through the telematics network and thereby creating valuable strategic options.

The automobile—a classic industrial-era product—is undergoing a major change in the digital era. With increasing computer and communication functionality, an automobile has evolved to become a computer-on-wheels. Now with the possibility of being connected to the Internet, the product and the underlying value propositions to the customers are changing.

Take for instance OnStar—a telematics-based service offered by GM on its cars (and is being tried out by a few of its partners like Audi, Lexus and Subaru). OnStar has transformed the automobile from a standalone mechanical engine towards becoming a node on a complex, fast-changing network of multiple services. These include automatic notification of air bag deployment, stolen vehicle tracking, medical network, emergency services, roadside assistance with location, remote door unlock, route support, concierge, and convenience services such as location of hotels, restaurants, gas stations and other points of interest.

What does this mean for GM and its customers? The trajectory of future evolution is by no means certain. The safety features may be embedded in the car and remote diagnostics and remote customer services could become the key differentiator. The performance of the automobile itself could become software-enabled, thus compelling the automakers to elevate IT to be a core facet of its operations. Alternatively, the concierge and convenience facets could be attractive fee-based offerings with high margin potential much like the financing arm today. Or the technology focus may shift from being car-centric to be person-centric through devices such as next generation personal digital assistants or third-generation mobile phones¹.

So, how should GM defend its current position while repositioning to win in the digital arena? GM has pursued a set of initiatives that captures some of the essential underpinnings of *scale* and *scope* options. Irrespective of OnStar's functionality, it is advantageous to have a large customer base to exploit network effects. So, achieving a bigger scale of operations as rapidly as possible is a critical requirement. GM has invested resources to equip its different models with OnStar functionality. It has also committed significant financial resources to let customers try the functionality during a

¹ For a recent discussion of telematics in this journal, see Anjan Chatterjee et.al., Telematics: Decision Time for Detroit in Volume 12, Issue 2, Summer 2001, pages 21-38. For a detailed discussion of OnStar, visit www.onstar.com. A discussion case *GM's OnStar in 2001: Beyond Airbag Deployment* is available from the authors.

Winning in the Digital Era

trail period free—much like software trials. Winning in the network era requires the establishment of a customer base to leverage network effects and GM is investing resources to capitalize on this.

This thinking has driven GM to persuade some of their competitors to join the OnStar network. GM and other carmakers have sought to obtain scale options through relationships. By early 2002, Audi, Subaru and Lexus are trying out the OnStar functionality for their customers. GM now has nearly 2 million cars that are OnStar-enabled on the road in the USA today.

A related issue pertains to the scope of services that would be rendered through this functionality. More broadly, how could the Internet be combined with the traditional bricks-based infrastructure to redefine the value chain of designing, manufacturing and servicing the automobiles? The technological developments are uncertain and customer preferences to use the Internet as part of their overall interactions have not yet been established.

Hence, GM has pursued a variety of initiatives that are in line with options thinking. GM entered into a strategic relationship with America Online to develop new products and services so that consumers can use the Internet to interact with dealers to not only buy but also manage the entire ownership lifecycle. Instead of establishing its own wireless network, GM entered into relationships with Verizon and GTE Wireless. This allowed them to share the risks involved in establishing a nationwide wireless network to support the expansion of in-vehicle services to include personal calling and access to the Internet.

The scope of services will change rapidly—the car radios are requiring being not only MP3-compatible but also capable of receiving digital satellite transmission. So, GM has invested in XM Radio so that the services of digital music could be bundled with OnStar. It has entered into a relationship with Sun Microsystems to develop the next-generation digital interfaces to the automobiles. Similarly, it has entered into a wide range of business relationships to access content and services that can be delivered on the OnStar network—these include WSJ, CNN, ESPN Sports and Fidelity. Clearly, GM has been striving to pursue a broad range of services that could be delivered and is acquiring scope options.

GM's ability to win will depend on the competitive moves by players in the auto industry and elsewhere. Ford has entered into a relationship with Qualcomm to create a new company—Wingcast to focus on mobile devices that could be plugged into the automobile. Microsoft has extended its windows CE platform to create Car.Net as part of its broader .NET strategy and has created a new entity in partnership with Accenture. Intel, Sun, Oracle and others are also jockeying to position themselves in the evolution of the telematics technology arena.

As the automobiles get connected to the Internet and as more drivers become dependent on different mobile devices, the competitive chokepoint in this marketplace is far from clear. Any myopic view of how this market will transform is blatantly limiting. Careful recognition of the broad set of opportunities and competitive moves from players outside the traditional automotive industry are key.

GM's likelihood of successfully positioning itself in the digital automotive arena is far from clear. At least, it is pursuing some attractive avenues.

2. Amazon—How to rapidly adapt the business model?

Lesson: Amazon has so often adapted its business model that it is difficult to categorize it. It's more than an Internet-bookseller as it seeks to deliver a broad range of products conveniently to its customers. For this purpose, it pursues a wide range of IT-based business initiatives, often with partners. Amazon's ability to acquire strategic options and nurture them by capitalizing on those likely to prove successful while exercising discipline to terminate unsuccessful ones highlights their approach to harnessing digital opportunities.

If we attempt to categorize Amazon and its business operations, we would be hard pressed to convincingly place them in any one category. Three years back, we could have compared Amazon to Barnes & Noble and Borders. Over time, Amazon has become a broad-based retailer—with enhanced scale and scope. They have built up scale and scope options through a wide range of alliances and relationships. They pursue different relationships but exhibit the determination to terminate those that prove to be not adding value when business conditions change.

Take for instance Amazon's relationship with Sotheby. In July 1999, they jointly launched an auction service so that Amazon's customers could get access to a broad range of products. In doing so, Amazon has acquired options to expand its business *scope*. What makes this interesting is Amazon's incorporation of finance into the equation. Amazon.com agreed to purchase a million shares of Sotheby's and acquired options to make further investments. As the Nasdaq slid over the last year, the two companies had to adjust their positions. In November 2000, the two companies combined the activities of sothebys.amazon.com with those of sothebys.com. Amazon will continue to have a formal marketing relationship, including maintaining a link from the Amazon.com Auctions site to sothebys.com.

Look at Amazon's pursuit of expanding its business scope expansion with automobiles. In January 2000, Amazon.com acquired 5% of the outstanding shares of Greenlight.com to introduce Greenlight.com to Amazon's customers. Amazon also received warrants to increase its stake to as much as 30% over the five years. In August 2000, the two companies further evolved this relationship with a new-car buying service. Since it is uncertain whether Amazon could successfully get its customers to buy cars from their site, it has been able to acquire and nurture *scope options* through this relationship. In early 2001, Carsdirect acquired Greenlight.com; and Amazon now has Carsdirect as a business partner.

A different line of business scope expansion can be seen in the relationship that Amazon subsequently entered into with Toys 'r' us. Amazon and Toys 'r' us created a co-branded site whereby Amazon developed the sites, housed all the inventory in its warehouses, filled orders and handled customer service and returns. Toys 'r' us closed its website and warehouses. Toysrus.com has paid per-unit payments to Amazon and has given Amazon warrants to buy minority stakes in the company. Toys 'R Us offers Amazon critical merchandising capabilities and its market clout in dealing with the

manufacturers. In doing so, Amazon has acquired options to expand its business *scale* in the toy segment.

Amazon has further expanded its business by creating co-branded sites with companies like Borders, Target and Circuit City. With Circuit City, it brings the capability of easy pickup rather than delivery through US Post Office or FedEx.

In the wake of many dot-com companies declaring bankruptcy, Amazon's survival and growth are not guaranteed; at least, Amazon is striving to nurture its set of options in support of its current vision 'earth's biggest selection'—quite a shift from earth's biggest bookstore!

3. Lotus—How to nurture Notes® while maximizing the business of 1-2-3?

Lesson: Lotus pursued the development of Notes with an innovative organizational arrangement. This allowed them to allocate and manage follow-on investments focused on maximizing the upside value. The case highlights the importance of organizational architecture to nurture and ultimately capture the value from the options.

In 1994, Lotus was pursuing its course with its 1-2-3 spreadsheet, its flagship product for the personal computer. During that time, a group of managers came up with idea of developing software to support groupware applications. The concept of networking was nascent at that time and it was dependent on the technological evolution of many different software and hardware products outside the control of Lotus. Mitch Kapur, the founder of Lotus felt that "there was no sensible way to make a business case for investing the resources it would take to develop the Notes concept sufficiently to decide whether it was a winner or not."²

However, Kapur and the management team formed a new corporation—Iris Corporation that was structured and managed the Notes project as an option. The solution was an investment logic that aligned the interests of the different parties while managing the uncertainties of this project. The following quote captures the essence of nurturing options on a sustained basis:

"Lotus was committed by the contract to fund the development of the product but Lotus did not own the product. Instead, Lotus had the right to review the progress periodically and decide whether to continue funding the project. As long as Lotus continued to fund the project, Lotus had the right to take the product to market at the point when it was ready. If Lotus stopped funding the project or decided not to bring it to market, Iris was free to take the product to market by any means it chose, including working with another company, such as Microsoft."

² See Larry Downes and Chunka Mui, *Unleashing the killer app*. Harvard Business School Press, 1998; pages 156-8.

Over a five-year period, Lotus committed to its flagship product Lotus 1-2-3 internally while supporting the Iris Corporation in the development of Notes. David Reed, a former chief scientist at Lotus remarked:

“Lotus was highly motivated to invest resources to learn how to bring Notes to market in the most effective way. If the best possible analysis determined that Notes had no value, then Lotus would suffer no remorse at writings off its sunk costs.

... I'm convinced that had Notes been handled as a 'normal' internal development project, the pressure to apply the best talent to short-term crises, plus the uncertainty about when the market would materialize, would have caused the [Notes] team to be reassigned, and the project would never have happened.”

Finally, when IBM paid \$3.2 billion to acquire Lotus. Much of the premium is attributable to the Notes® platform and not for Lotus 1-2-3 spreadsheet which by then had lost its market position to Microsoft Excel. Lotus capitalized by adopting options thinking—reflecting an important tenet of providing commitment to Notes successively. In addition, it created appropriate organizational arrangement to nurture its evolution through profound uncertainties.

The case illustrates the importance of organizational arrangements to pursue winning strategies in the digital economy. It is not that it is always important to have a separate division but what is important is to understand how different organizational arrangements facilitate or constrain the single-minded pursuit of ways to succeed in this uncertain era.

From Cases to Concepts: A Strategic Options Navigator

The above cases, when viewed through an options lens, highlight four key activities associated with formulating an effective digital strategy:

1. **Assess opportunities** by thinking about the “possible” and not simply, the “probable” future outcomes.
2. **Acquire options** by making investments that provide flexibility to make future strategic moves can be conditioned by future outcomes.
3. **Nurture options** by continued re-assessments and taking needed actions to keep the options alive.
4. **Harness value** by exercising the options in a timely manner.

A classic view of strategic planning is that it is calendar-driven: five year long range business plans translated into shorter-term operational plans and budgets. That model worked well in the relatively predictable areas of the industrial age. Recognizing the dynamic nature of these activities, we develop an approach to guide executives navigate the uncertainties of the digital era.

This 'strategic options navigator' (SON) develops a logic for pursuing digital opportunities. It is not a complex analytical solution but a systematic approach to formulating and implementing an effective strategy that recognizes the inherent nature of uncertainties present in the economy and responds through a discipline reflective of the markets. The focus is on managing rather than minimizing risk. It highlights the critical role played by organizational characteristics—especially structure and processes—in creating the ability for an organization to successfully compete. It recognizes that superior strategies will involve key relationships with other corporations in a vibrant business network. So, we focus on how these activities are linked through stages as shown in figure 1.

Stage 1: Assess opportunities and acquire options

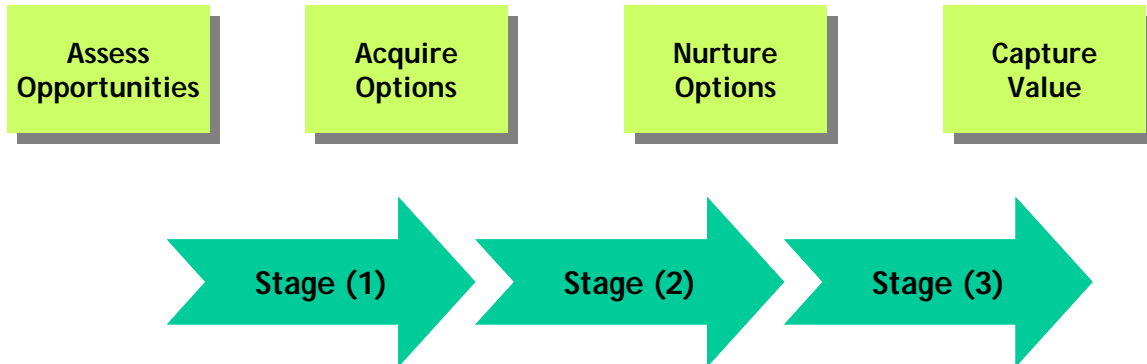
In the industrial economy, opportunities for growth could be analyzed using relatively predictable models; the risks of major failure could be predicted through shifts in technologies and/or substitute products and processes. Companies looked at opportunities within their narrowly defined industries or in related areas. Product extensions for the current markets or market extensions for the current products were logical avenues to examine growth opportunities. The industry (defined around products and production) served as a key construct for circumscribing opportunities.

In contrast, the Strategic Options Navigator begins by looking at a broad array of possibilities through a cone of uncertainty, which grows as we look further into the future. Strategic investments must then be chosen to hedge against the adverse outcomes. We saw how GM is exploring a wide range of options in this stage.

GM is not alone. Look at Sony, which is in the midst of a major shift in its strategy. In 1999, Chairman Imai signaled a shift in Sony's strategy: 'old Sony sold standalone products, while the new Sony will sell connections.' Their traditional strategic logic was based on decentralized product development. The various consumer electronic product categories like televisions, VCR, camcorders, music players and others were historically standalone gadgets. In a network era, they connect among themselves as well as act as gateways to the Net. Again, as in the case of GM, the directionality of evolution of how these devices will connect to the Net is uncertain. In addition, the likely competitors in such a networked space are also uncertain. So, as Sony redirects its business strategy, it needs to pursue a broad range of opportunities.

So, as we look at some of the salient moves Sony has made in last few years, their strategic direction will become clear: PlayStation2 is a game console with broadband capability to access and play games with opponents on the network; their recent video camcorder has capability to be linked to the Internet without using a personal computer to transfer images; and they have joined together with Ericsson to create a joint venture to design and deliver next-generation devices that will integrate the different disparate consumer devices that we have today.

Strategic Options Navigator



Sony illustrates an important characteristic of the Strategic Options Navigator—that a cone of uncertainty, rather than a single evolutionary trajectory better represents the opportunity space. Sony also points to the need to not dive into possible markets but experiment, often with partners, and acquire options.

Are you looking at the opportunity space broadly and acquiring an appropriate set of options to enable you to win in the uncertain digital arena?

Stage 2: Acquire and nurture options

Unlike financial options that are contractually specified, acquiring strategic options is only the beginning. As a consequence, they must be periodically re-evaluated and actions taken to keep strategic options alive. The actions on some options invariably trigger subsequent reassessment of opportunities as market conditions change rapidly and, in turn, compel firms to acquire more options of a different nature to respond to the new sources of uncertainty.

In many instances, nurturing of involves making additional investment and maintaining relationships with external parties. Acting on options at the right time is not a matter of luck: it is a matter of developing an organizational capability to know the value of exercising their options at different time periods and under different conditions. The challenge is to design an organization—where the decision-makers are empowered to act in an autonomous fashion under some specified boundary conditions. Even more importantly, budget constraints often limit an organization's ability to act. Amazon's strategy described above illustrated how an options-based strategy must be seen as a pattern of organizational actions on their options to effectively adapt your business model.

Amazon is not unique in its approach. Take the case of the Mobil's introduction of Speedpass, a wireless transaction system aimed as a convenience for customers at the gas pump. Over the last five years, it has acquired a customer base of 5 million users. ExxonMobil now sees Speedpass as a general payment mechanism, competing with credit cards. The idea behind the project was to get customers in and out of gas stations as fast as possible. The initial results have been encouraging—customers average one visit more per month compared to those that do not use this device and also spend 2% to 3% more per month.³

Since this idea could be imitated and strategic advantage is unsustainable, ExxonMobil is pursuing ways to expand its range of use. They are pursuing experiments to have the Speedpass accepted in other establishments where customer transaction time may be critical (e.g., McDonald's). Clearly, this is in the initial stages and needs to be nurtured. Should ExxonMobil invite other gas companies just as OnStar has done in telematics? What should be the other set of players in the network? Should it evolve in cooperation with a credit-card provider like Visa or in competition? Those are the questions that are important to continually nurture the options.

Are you looking at different ways to nurture the different options both in terms of keeping the options alive as well as acquiring follow-on options?

Stage 3: Nurture options and capture value

When you exercise a stock option, you pay the strike price and purchase the stock. In contrast, as the cases make apparent, strategic options have a nested or compound nature. In other words, acting on the first option results in an option to act on the second and so on. For example consider a product requiring a sequence of investments: design, development, production, and finally, marketing launch. At each stage the firm act on the option in one of two (or more) ways - abandon the new product, postpone the next investment, or commit the next investment to keep the remaining options alive and be in a position to capture the potential benefits.

We need to focus on the link between the actions and the creation of business capabilities. This involves one or more of the following actions. First, we need to be concerned with follow-on investments. This involves the allocation of complementary resources to create the business value. Often firms fail to incorporate the follow-on resources required to turn an option into critical business capabilities. The second involves an organizational willingness to abandon projects. Few companies have the discipline to abandon certain projects--because they might not provide the necessary benefits. Third, it is equally important to introduce complementary initiatives. Under rapidly changing conditions, the nature and value of assets change quite rapidly. This is

³ More details available in the November 2001 *Pay As You Go*, Fast Company, <http://www.fastcompany.com/online/52/speedpass.html>.

particularly true as we are at the cusp of shifting to new forms of assets—digital and intangible.

Acting at the right time is not a matter of luck. It is a matter of developing an organizational capability to know the value of exercising their options at different time periods and under different conditions. The case of Lotus Notes illustrated how strategy can be seen as a pattern of organizational actions on their strategic options.

Even if conditions pan out favorably, not all firms have been successful in capturing the value of the strategic options they acquired and nurtured. Take the case of Enron Corporation, which over the last decade was viewed as the poster-boy for successfully implementing a strategy to acquire and nurture valuable strategic options. During a short six-month period at the end of 2001, a series of organizational missteps brought about a precipitous fall from grace, when their creditors and investors realized that Enron would be unable to capture the value of their strategic options.

Enron's business model relied on two technologies: information (communication and computing) and financial (risk management). Enron entered into new markets as a broker, trader, and often, also as a market maker. In some cases Enron made strategic investments in key physical assets, and created an ability to complete the markets. Their ability to marry the emerging eCommerce technologies with financial engineering placed Enron at the pinnacle of business innovation.

Succeeding in this arena requires a solid credit rating: Enron was able to extract high leverage on its asset base, and use its strong balance sheet as credit collateral. Although the complexity of Enron's business model made their balance sheet opaque to the markets, growing earnings made market participants view Enron as an excellent credit risk. But as it grew fast, Enron lost its ability to keep track of all the risks and often took on large positions and faced unforeseen risks. For example, Enron did not have deep expertise in markets like telecommunications bandwidth, water, steel, paper pulp, semiconductor chips, or advertising, to name some of their recent forays. It is as if Enron's phenomenal success created such hubris in the top management that they began disregarding the much touted risk management discipline.

As several high profile bets (bandwidth and electricity) failed and general economic conditions softened, Enron produced high revenue growth quarter after quarter. What brought about such a precipitous fall, was the actions Enron took to camouflage their true earnings. They hid behind an array of accounting loopholes by creating asset swaps with related-party partnerships. Uncovering these dealt a fatal blow to Enron's reputation, which was critical to their ability to trade.

Does what happened at Enron spell the end to the business model that it articulated? We think not. In fact, the business model is sound but implementing it requires management discipline. While the entrepreneurial culture at Enron was well suited to strategically invest in this new model, the organization was unable to impose the needed discipline to reign in the value. As is common in history, the model will be fine-tuned by followers. Someone else will capture the value.

Are you nurturing the options in a way to extract value; do you have the administrative mechanisms to capture the value like we saw in the case of Lotus? Or are you more similar to Enron in terms of setting up the options but letting the value disappear?

Strategy Implications

The strategic options navigator is based on an important premise. That the strategic logic of creating and capturing value in a digital economy is based on coordinated actions across three domains—business (CEO), information technology (CIO) and finance (CFO). More than ever before, companies need to think about bottom-line profits and top-line growth simultaneously. This requires that these three domains coordinate to create ways to win in the digital era. Figure 2 is a schematic representation of the three-way connections. We summarize by enumerating the shifts in the three roles as a set of challenges below.



CEO challenges

- **Recognize digitization opportunities amidst challenges.** It appears that every business—irrespective of the industry—is being impacted by digitization. GE added digitization to be one of the four components of the company’s operating systems along with globalization, services and six-sigma quality. We now know that the

digitization is more than the dot-com phenomena of the startups but is impacting product features and processes. Just as an automobile is transformed when connected to the digital network, we need to be concerned with the potential opportunities and the challenges. CEOs need to be particularly concerned with the likely threat from some one outside the traditional industry—who may be able to capitalize on their technological expertise to capture the opportunities.

- **Capture value in top-line growth and bottom-line profitability.** Digital initiatives go much beyond the obvious near term cost savings that affect the bottom line of existing operations. Instead, the real strategic value comes from impacting the top line revenue sources—in terms of enhanced margins and streamlined business processes. CEOs should increasingly think about ways to exploit developments in areas such as the mobile Internet or broadband or next generation Internet. At the same time, the digital arena offers many different ways to reduce costs of transactions and customer service delivery.
- **Pursue initiatives with alliances.** Winning in the digital era is based on pursuing opportunities and capturing value through alliances and partnerships. Not all options capabilities lie inside the current organization. Many can be effectively procured by creating alliances and other hybrid organizational forms like Sony and Ericsson's new joint venture. This allows you to share risks and rewards as Amazon and Toys 'r us are pursuing. The web is a dynamic network and serves as a useful metaphor for strategizing in the new economy. Strategy needs to be thought in network-centric terms rather than firm-specific terms.

CFO challenges

- **Focus beyond gate keeping.** The finance function has traditionally been a gate keeping one charged with the task ensuring adequate returns on IT investments arising from cost savings and efficiency gains. While this made sense from a cost center view of IT, it ignores is the potential future business opportunities that are enabled by putting in place IT capabilities today. In other words, the strategic option value of IT is too often ignored. We stress the importance of viewing major IT investments as options in the design, the justification, and subsequent management of such investment.
- **Deploy new financing mechanisms.** The role of finance in striving for top-line growth is not just about net present value and return on investment calculations in business plans. It can have substantial implications to the way projects are financed. The use of new financing mechanisms including new sources of funds, new contractual structures, and new ways of inter-locking companies through cross-holding of equity etc. is necessitated by framing investments as options.
- **Design incentives for managerial action.** The digital era also is characterized by fast-changes requiring that companies act at the appropriate time to lock-in value. This requires the articulation of incentives for key managers to take actions and that these managerial incentives are aligned with corporate goals. Lotus provided a compelling example of how this played a part in creating and capturing value.

CIO challenges

- **Shape the digital infrastructure.** The new requirement is to shape the business infrastructure for the digital era—as a hybrid of physical and digital operations. It is also about making the infrastructure seamless to interface to complementary products and business processes so that the best-in-class modules can be plugged in easily like Amazon’s business operations. Just as the factories shaped the business operations in the industrial age, the digital infrastructure shapes the business possibilities in the new era.
- **Pursue a balanced portfolio of projects.** As we stated at the outset, the role of IT should be to pursue projects that would result in cost reduction and revenue enhancement. Cost center projects may be easy to justify and easy to implement but they could also be imitated easily by competitors. So, the real value-added of the IT function is to simultaneously pursue and justify projects that contribute to multiple business goals in the short and long term.
- **Be disciplined in project management.** One of the key skills that the IT operations bring is disciplined project management, which complements the investment management focus of the finance operations. This discipline comes in handy to manage projects for cost and time parameters as well as having the discipline to cut losses and redirect resources.