

VISIONS AND VOICES ON EMERGING CHALLENGES IN DIGITAL BUSINESS STRATEGY¹

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Introduction

This section is a collection of shorter “Issue and Opinions” pieces that address some of the critical challenges around the evolution of digital business strategy. These voices and visions are from thought leaders who, in addition to their scholarship, have a keen sense of practice. They outline through their opinion pieces a series of issues that will need attention from both research and practice. These issues have been identified through their observation of practice with the eye of a scholar. They provide fertile opportunities for scholars in information systems, strategic management, and organizational theory.

The first piece is titled “Leadership in a Digital World: Embracing Transparency and Adaptive Capacity” by Warren Bennis, University of Southern California. Bennis has been a distinguished scholar of leadership for over 50 years, and

has also engaged with hundreds of senior executives. Bennis points out why and how digital business strategy is an important transformational issue for leadership. He argues that information-driven transparency will forever change the way that power is derived by top leaders, and that leaders need to embrace this new transparency. They must also be able to understand how to use the new management instrumentation the digital world brings, similar to how physicians take advantage of the power of new medical instruments, such as functional MRIs. Bennis also accentuates the criticality of adaptive capacity as a leadership quality in the digital world, coupled with resilience and openness to the new. He argues that such qualities are neither nature nor nurture but an interaction of the two, suggesting that effective leadership in a digital world needs to be learned through embracing transparency and adaptive capacity.

The second piece by Nelson Granados and Alok Gupta, titled “Transparency Strategy: Competing with Information in a Digital World,” addresses a different aspect of transparency: market transparency related to the disclosure of information outside the boundaries of the enterprise. Granados and Gupta

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contend that there is a greater need for a transparency strategy in a digital environment. They articulate the informational elements of an effective transparency strategy and some of the strategic options around it (disclosing, distorting, biasing, and concealing), and some of the dangers of ignoring it.

The third piece by Peter Keen and Ronald Williams is titled “Value Architectures for Digital Business: Beyond the Business Model” and argues that digital business strategy will be driven by value architectures rather than business models. Drawing on many case examples from practice, they advocate taking a fresh look at the concept and tenets of value in the context of digital business strategy. Keen and Williams argue through illustration that in digital business, value is a function of the choice space rather than the product or service—and, most importantly, that value is always shifting and a moving target. Thus, digital business is driven by opportunities to expand the choice space by exploiting the forces of disturbance. The critical task for effective digital strategy requires building value architectures that accommodate ever-continuing shifts in value, and Keen and Williams provide new frameworks for understanding how to think that through. They also provide implications for what that focus on value architecture means for the IT organization.

The fourth piece by Lynne Markus and Claudia Loebbecke is titled “Commoditized Digital Processes and Business Community Platforms: New Opportunities and Challenges for Digital Business Strategy.” Markus and Loebbecke develop the notion of the larger unit of analysis as a business community to accommodate the possibility of overlapping ecosystems with multiple orchestrators. This brings into play the notion of a community platform that is tailored for use by all members of a community. They also contrast commoditized business processes (that are performed the same way throughout a business community) with standardized business processes (that can be tailored to an orchestrator’s preferences). They then argue why and how these distinctions are critical for digital business strategy, and what the consequences of process commoditization and business community platform adoption are for the strategic advantage of ecosystem orchestrators.

The fifth piece by Varun Grover and Rajiv Kohli is titled “Revealing Your Hand: Caveats in Implementing Digital Business Strategy.” Grover and Kohli argue that indiscriminate short-term digital initiatives can reveal an enterprise’s intentions to competitors and erode competitiveness in this age of what they call “micro-applications” (what are casually termed as “apps”). They propose a visibility–value framework that examines the trade-off between system visibility with the ability to appropriate value from such systems, and suggests how firms might make such choices.

In the introductory article to this special issue, we identified four key themes that could guide our future thinking on digital business strategy: (1) the *scope* of digital business strategy, (2) the *scale* of digital business strategy, (3) the *speed* of digital business strategy, and (4) the *sources of business value creation and capture* in digital business strategy. These four themes are reflected within these five very thoughtful pieces, but are sliced differently.

In combination, these five pieces indicate to us that the emerging challenges in digital business strategy are occurring at several levels. There is a leadership challenge that will require new capabilities of senior executives and CEOs, and embracing new values such as information transparency, adaptiveness, and resilience. There is a market challenge that will require a deeper understanding of the strategic implications of market disclosure and inadvertently revealing strategic direction through digital moves. There is a broader ecosystem challenge which requires new forms of digital collaboration, processes, and infrastructures. There is a value architecture challenge wherein value is a different animal, and is shifting and a moving target in the context of digital business strategy. These challenges are food for thought, and provide wonderful opportunities for both research and leading-edge practice. We hope they will provoke others to further advance what we need to know about digital business strategy. We need to address these exciting challenges while also understanding that going forward we will have to continuously have new ways of re-imagining the future.

LEADERSHIP IN A DIGITAL WORLD: EMBRACING TRANSPARENCY AND ADAPTIVE CAPACITY¹

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Digital business strategy is a very important issue for leadership because it is going to fundamentally change every leader's life—whatever type of institution they are leading. The ubiquity of information and the bandwidth of access that leaders have and are exposed to will continue to grow in amazing ways, and this will make transparency inevitable. This means that leaders at every level of the organization will know what is going on every minute of the 24-hour day, and no fact will be left behind. I am not talking about a totalitarian surveillance state, although it can be used in such a way, but rather the beauty of it is the speed with which you can get feedback on your products in the marketplace, and how your customers are being dealt with, etc.

This information-driven transparency will change the way that power is derived. Power in our society is mainly derived from the absorption of uncertainty with multiple stakeholder groups. Information ubiquity in a digital world helps every leader at every level to a better understanding of the various stakeholder groups that they have to take into account—provided they take advantage of it. And when we think about the complex constituency of stakeholders today, they are more complicated, more eloquent, and more noisy—and more important to consider. It would be very hard for leaders in this digital age to ignore or not be aware of social networks and what is being discussed in them related to their organization. They are also publicly exposed through all of the

information available about them on the Internet, people having a camera in their mobile phones, and the rapid viral effect of social networks. Think of all those places in the Middle East where revolutions often started with a few protests and suddenly they became hundreds and then thousands. Could this have happened that quickly without digitization? Furthermore, the former dictators of those countries such as Egypt where the Arab Spring occurred were clearly not in step with social networks and those technologies became a powerful weapon that accelerated their demise.

What I am getting at is that if a leader at any level does not understand how to use the digital world and its accompanying instrumentation, and if they do not understand the power that it has on their relationships with their stakeholders—be it their customers, employees, partners, or the whole supply chain—then they will be seriously left behind. It is a blessing of the digital age to know the bad news quickly, so something can be done about it as soon as possible. In a world of increased transparency through digitization, leaders need to understand the power of instrumentation and what it enables. Like physicians understand the power of functional MRIs in really understanding what is going on in the brain, so must leaders understand the power of digitization in really understanding what is going on in their environment. Every development you get in the digital world that we are living in can be our enemy or can be our best friend, and leaders have got to understand that it has got to be their best friend. And they need to understand the power of the instrumentation that comes with it.

Why are some leaders able to figure out the relationship between the instrumentation and what they are trying to do and some are not? Is that a personal characteristic or is it a

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function of the context and the environment? I believe it is the interaction between the two. One of the things that is most important in effective leaders is their *adaptive capacity*—and the digital environment can enhance adaptive capacity. When I use the term adaptive capacity, I typically think of a number of important items. One of these is *resilience*—that is, coming back effectively, and rebounding from difficulty or adversity. Howard Schultz, the CEO of Starbucks, recently wrote a book titled *Onward: How Starbucks Fought for its Life Without Losing its Soul* in which he talks about rebounding. I think a lot of it had to do with getting information from those 17,000 coffee shops. He says, “I smelled something was wrong,” and when he said “I smelled,” he was not just talking about his nostrils and smelling coffee. He was getting an idea of what was going on through his various Internet connections with the stores in New Orleans, the stores in Seattle, the stores in Paris, Hong Kong, China, all over the world. It wasn’t just “I smell that we are losing our way.” What he smelled was more important—he smelled that the environment, the culture, was different than what he had in mind. He said, “It’s not the company I thought I founded.” He got it from listening to people through digital channels. How else would he know what was going on in 17,000 coffee shops around the world? What an advantage that is, to get feedback so quickly if you want it, and you better well want it if you want to be an effective leader in a digital world.

Regarding this nature versus nurture issue with effective leaders in the digital world, it has to do with openness to the new. This is based on a lot of factors: sometimes it is person’s personality: they have a hard time trying a new food; they have a hard time finding a new hair dresser; they have a hard time finding a new store in which to buy their ties or their clothes; they do not want to see that movie because

they don’t see movies like that—that is just part of their temperament, which is more closed than open. The second part of openness is being able to learn what you don’t know from your failures and mistakes. I am 87 years old, for God’s sake, and right now, I feel very fortunate because I do think I am open to innovation and the qualities of leadership in the digital world. In addition to resilience and openness, the quality of adaptive capacity is an optimistic sense of can do and can try. It does not mean that you have to crazily adopt every innovation, but you have to believe in the power of digital technologies in changing the ways we lead and manage. Anyone who doesn’t see the possibilities—well then, if you want to be blind, be blind. Transparency is inevitable at every stage of our existence. Yes, it will be misused, but we had better learn about it and embrace it if we are going to be effective leaders in the digital world. And we had better learn how to enhance our adaptive capacity in the digital world. Unless we want to be seriously left behind.

About the Author

Warren Bennis, born in 1925, is a scholar, organizational consultant, and author who is widely regarded as the pioneer of the contemporary field of leadership. Bennis is University Professor at the University of Southern California, and is Distinguished Professor of Business Administration at the USC Marshall School of Business. He is also the Founding Chairman of The Leadership Institute at USC. In 2007, *BusinessWeek* called him one of ten business school professors who have had the greatest influence on business thinking. Bennis has authored numerous books and articles on leadership for more than half a century. *The Financial Times* recently named his classic book *Leaders* (with Burt Nanus) one of the top 50 books of all time. With Robert Thomas, he is the author of the 2002 book *Geeks and Geezers: How Era, Values, and Defining Moments Shape Leaders*. His most recent 2010 book is *Surprised Surprised: A Memoir of a Life in Leadership*.

TRANSPARENCY STRATEGY: COMPETING WITH INFORMATION IN A DIGITAL WORLD¹

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We contend that in order to compete effectively in a digital business environment, firms should develop a transparency strategy by selectively disclosing information outside the boundaries of the firm. We make the case for transparency strategy by showing why it is relevant in the digital business world, and the consequences of not having such a strategy. We then provide some foundations to develop the strategy and make a call for research.

Keywords: Digital business strategy, electronic markets, transparency strategy

Background

The Internet and mobile technologies have brought markets closer to the utopian state of *perfect information* by reducing the information asymmetries between sellers and buyers. For buyers to make a purchase decision, it is a lot easier to search online for product alternatives, prices, product performance (e.g., reviews), and vendors.

In turn, firms have unprecedented flexibility to conceal or disclose information to competitors, customers, and suppliers. That is, they are increasingly able to implement transparency strategies. In fact, by pushing a mobile application to potential customers or with simple changes in a website's design, a seller can reveal more or less information about its product offerings. Also, information is increasingly consumed via online news, blogs, and social networks, where viral effects can significantly increase speed to market and communication effectiveness.

End consumers increasingly expect to be very well informed, spoiled, and empowered by the Internet and by mobile devices that provide instant access to information. This creates pressure for all players upstream in a supply chain to be more transparent, not just about the features, price, and quality of a product, but also about its provenance (New 2010). How should firms strategize in this environment? Some argue that the best approach is to satisfy this demand for information by becoming more transparent (Tapscott and Ticoll 2003). In this article, we contend that the answer is not so straightforward. Instead, we argue that firms should strategically and selectively disclose information, and we make the case for the need to develop research and best practices on transparency strategy.

Why Does Transparency Strategy Matter?

In the past, legacy systems, industry norms, or firms with market power dictated the level of transparency that was present in a market, leading to the existence of stable *trans-*

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parency regimes (Granados et al. 2010). In the last few decades, the Internet and mobile technologies have disrupted these regimes, making some players better off and others worse off. For example, online travel agencies brought higher transparency of product offerings to travelers, which led to the disintermediation of traditional travel agencies. In financial markets, the transition from floor trading to electronic trading made stock trade history more transparent, which benefitted individual investors but threatened the viability of intermediaries (Clemons et al. 2002).

In such turbulent environments, the effective use of IT becomes a strategic imperative for firms (El Sawy et al. 2010) as they develop dynamic capabilities to be alert, predict the future, and effectively compete (Sambamurthy et al. 2003). We argue that one set of capabilities that a firm must develop is to design policies for selective information disclosure and to deploy technologies that enable them. But competitors are bound to respond with their own innovations. This dynamic process will lead to new transparency regimes that differ across industries, depending on the nature of the product sold and on the industry's competitive and regulatory forces (Granados et al. 2006).

In the end, those who are able to foresee and adapt to the effects of technological breakthroughs on transparency will be better able to compete. However, the uncertainty associated with technological progress can blur the vision on how to develop these capabilities. We have observed two common myopic reactions (Granados 2008):

- **Defensive denial.** In increasingly transparent markets, some firms retrench to protect their turf, fighting against an inevitable trend. This reaction is partially motivated by the fear of losing information advantages. For example, widespread availability of information about prices in electronic markets can lead to more competition and lower market prices. So in the 1990s, faced with this threat, established firms across industries (e.g., music, travel, financial services) initially avoided Internet-based distribution.
- **The passive reaction.** Perhaps a better—yet not good enough—approach is when firms acknowledge the transformation, but they assume that there is not much that can be done to manage and control information. For example, with the proliferation of customer reviews and other third-party information in social networks, firms often fall short in developing effective social media strategies to protect and improve their reputation.

The consequence of these reactive approaches has been that existing competitors and new entrants find fertile ground to

develop innovative business models and establish long-term competitive positions. For example, Blue Nile, an online jewelry store, was launched by an entrepreneur to educate consumers on how to discern quality and features of jewels, and today it is still one of the leading online jewelry stores. Not all winners are start-ups. In the 1990s, Microsoft launched Expedia, an online travel agency with a web-based, transparent interface to display to consumers the travel offerings from traditional reservation systems. To date, Expedia is the leader in online travel distribution. Progressive, an insurance company, has been successful with a transparency strategy to attract customers, by showing a comprehensive matrix of all competitive product offerings. Not all successful strategies are about higher transparency. Hotwire and Priceline.com emerged early on to become leaders in the market niche of opaque travel offers, which conceal travel itineraries and supplier identities prior to purchase.

The interplay between strategy, IT, and the environment is complex, messy, and chaotic (El Sawy et al. 2010), which may derail business executives from developing a vision to strategize with information. But this is no excuse for complacency. Firms should be proactive and deliberate in understanding how IT impacts transparency in their respective industries, in order to develop sound transparency strategies. We next provide some preliminary foundations and guidelines.

Foundations for Transparency Strategy

The traditional definition of information strategy is a firm's strategy to *produce* and *manage* information. It has long been a topic of research and practice in the IS field. We contend that in this digital world, firms need to move beyond this scope to also develop a strategy to *disclose* information. Firms have to make decisions about information disclosure both *inside* and *outside* the firm, but it is the latter one which we contend needs increasing attention from researchers and practitioners. Therefore, for the purpose of this article, we define transparency strategy as the strategy to selectively disclose information *outside* the boundaries of the firm, to buyers, suppliers, competitors, and other third parties like governments and local communities.

There are four possible strategic options (Granados et al. 2010): To disclose, distort, bias, or conceal information (see descriptions and example in Table 1). Any of these may be valid depending on a firm's business strategy, its competitive

Table 1. Example of a Firm's Transparency Strategy

<i>Informational Element</i>	<i>Strategic Option</i>	Disclose	Distort	Bias	Conceal
		Full revelation, information is available and easy to interpret	Information is outdated, incomplete, inaccurate, or obfuscated	Preferential display of information to the detriment of competitors	Full opacity, information is not available
Product features				X	
Product quality		X			
Price				X	
Cost					X
Inventory			X		
Processes					X

position, and other industry factors. In addition, a strategic option can be selected for different informational elements, such as product characteristics, price, costs, inventory, and processes.

The firm in this example (henceforth the Firm) provides biased information about product features and prices. Current practices include displaying only the Firm's products and prices in its web portal or social media page, applying search engine optimization techniques to get preferential display in search engine results, and using price recommender systems to rank high in search results sorted by price.

There are several factors that make transparency strategy non-trivial. First, some managerial decisions not directly related to information disclosure can nevertheless impact transparency. For example, to increase its reach, the Firm may be inclined to offer its products in an electronic market (e.g., Google store), but there are potential impacts on transparency that must be considered. One advantage of participating in electronic markets is that the Firm will appeal to buyers who demand unbiased information about offerings from all vendors. Also, by having high visibility of competitive prices, sellers can tacitly collude in order to sustain higher prices. However, electronic markets also make prices transparent to buyers, which can lead to more intense competition and lower market prices (Soh et al. 2006).

Second, information disclosure via the Internet cannot be easily restricted to its intended audience (e.g., consumers), because other parties (e.g., competitors) also have access to the information. In our example, the Firm has chosen to present inventory information in a distorted manner, because while transparency of stock levels may add value to buyers, competitors can also see the information and use it to their advantage (Dewan et al. 2007). One common approach is to

only disclose whether the item is in stock or not. Another approach would be to show stock levels only when they are low, which can induce sales by creating a sense of urgency in the mind of the buyer. But even then competitors may infer a supply shortage and increase prices to improve their margins.

Third, disclosure of an informational element can have unintended impact on other informational elements. For example, the Firm follows the common practice of being opaque about its costs. However, if the Firm sells its products in electronic markets, buyers will have increased access to price information and over time they may be able to infer the Firm's cost structure (Zhu 2004).

In summary, the science and practice of transparency strategy is about selecting a strategic option (e.g., disclose, distort, bias, or conceal) for each informational element, and for different parties outside the firm (e.g., buyers, suppliers, competitors). But there are complex dependencies, trade-offs, and indirect effects that must be considered. Next, we present some managerial guidelines based on our observations of practices in firms that have done it successfully.

Guidelines to Develop a Transparency Strategy

Four guidelines to develop a sound transparency strategy have emerged from our research. They stem from the fact that in most organizations there is no single owner of the problem. When it comes to product and price information, marketing managers take ownership. Cost transparency may fall in the hands of the finance department. Lawyers and public relations departments also play a role. Therefore, several functions should coordinate to develop a comprehensive and sound strategy.

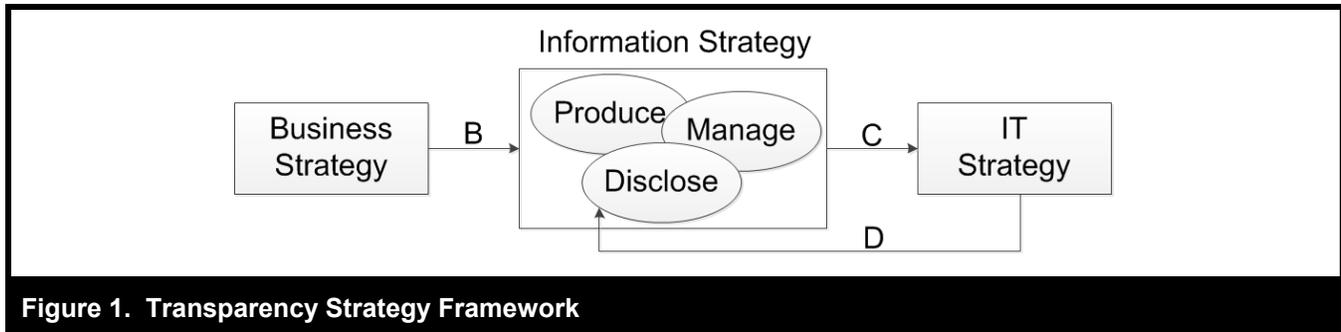


Figure 1. Transparency Strategy Framework

Have a Strategy

We argue that it is imperative in today’s digital world to have an explicit transparency strategy. When it is absent, related managerial decisions are often made haphazardly or inadvertently, leading to myopic reactions (see the earlier section, “Why Does Transparency Strategy Matter?”). The strategy should be deliberate both in development and execution, led by C-level executives, and aligned with the business and IT strategies (see Figure 1).

Lead the Strategy

The CEO must lead to ensure that there is a transparency strategy and that—as a core component of an information strategy—it is well aligned to the business strategy (see Figure 1, arrow B). C-level executives must jointly develop it. Because there are so many interdependencies across informational elements and therefore across business functions, close interdepartmental coordination is necessary to make sure the strategy is comprehensive and coherent. Also, the CIO will play an important role to ensure that the firm’s IT infrastructure supports the transparency strategy.

Enable the Strategy with Information Technology

A firm’s IT strategy and infrastructure can constrain or enable its transparency strategy. If the current IT platform limits the ability to implement a strategy, it should be modified or enhanced accordingly (see Figure 1, arrow C).

The CIO can also lead IT innovations to create and enable novel transparency strategies. For example, Orbitz developed an advanced IT platform to become the most transparent online travel agency, effectively disrupting the industry’s transparency regime. Google’s unbiased organic search, a

key component of its business strategy, was backed by an innovative ranking algorithm and technology infrastructure to crawl the World Wide Web. Priceline.com has a patented *name-your-own-price* mechanism that enables the bid process for its opaque travel offerings.

Monitor Competitive Moves and Technological Advances

Today, with simple changes in lines of code or by innovating with new technologies, a competitor can make strategic moves to disclose, bias, distort, or conceal information in the market. The CIO and her staff can play a key role in monitoring these innovations, designing a competitive response, and assessing whether the firm should revise its transparency strategy (see Figure 1, arrow D).

Future Research

Much remains to be learned to develop a core set of theory and principles that guide the practice of transparency strategy. For decades, the IS field has focused on the supply side of information, that is, how to produce and manage information, primarily for a firm’s internal consumption. The agenda is wide open for research on the demand for information outside the firm, and on the strategic and technological implications. What information is demanded by third parties? How do disclosure, distortion, bias, and opacity of specific information elements affect buyers and other third parties? How do different information elements affect each other? How can technology support a firm’s transparency strategy? In this article we present some theoretical and practical guidelines, but we have just touched the surface.

More case studies about successful transparency strategies will help develop our understanding of emerging best practices. For example, it will be interesting to examine how

social media and other emerging technologies enable firms to implement strategies through a more interactive approach with customers and other third parties. Traditional methods like modeling and experiments can be used to examine the impact of disclosing, distorting, biasing, and concealing specific informational elements. We also foresee new theoretical approaches being used to examine how technology impacts transparency regimes over time, such as novel systems thinking methods and the use of combination theories (El Sawy et al. 2010) to identify sustainable strategies.

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VALUE ARCHITECTURES FOR DIGITAL BUSINESS: BEYOND THE BUSINESS MODEL¹

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This article is a “sense-making” treatise that identifies the general factors that seem to determine digital business strategy success and what they imply for management. It is based on a review of two types of polar companies that stand out as exemplars of innovation.

The first are *ultrasuccesses*, firms that surge to growth and redefine the dynamics of competition within and across sectors and that have been able to sustain their pace-setting. Digital business-centered examples are Amazon, Apple, Expedia, Google, Facebook, Bharti Airtel (India), Huawei (China), and Tesco (UK), to pick just a few big names. Longer-standing instances are Southwest Airlines, Li & Fung (Hong Kong), Starbucks, Walmart, FedEx, and Toyota (it is unclear if Toyota’s recent problems are hiccups or chronic illness).

There are other contrasting firms that are *ultrafades*. They were just as dominant, apparently invincible and quite literally the textbook pointers to management for the future. They include Dell, AOL, Blockbuster, Nortel, Nokia, RIM, Barnes & Noble, Gap, Kmart, Sony, Sears, and A&P—all in the same class of legend. In most instances, these firms made no massive or sudden blunders and they were often still in the textbook “Hall of Fame” even as their erosion had become marked and even irreparable.

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Keywords: Digital business strategy, value architecture, creating value

There is not much to learn from companies that miss the boat in digital business or throw technology and new products onto the market in the hope that, because “it is the Facebook era” or the world “is going mobile,” throwing money at the rainbow must at some point drop on the pot of Internet gold. All one can offer is “Don’t be dumb” (or “Remember what happened with your e-commerce dot com venture?”). The more intriguing questions are why did Dell slip and how did Myspace somehow give away its lead? How did Tesco successfully build a highly profitable \$2 billion online grocery business, a sector where Webvan had been the largest ever dot com bust and no other player, even Walmart, has been able to build a solid base? How did Facebook become such a success and yet now seems adrift in building on its franchise?

In trying to make sense of all this, what is apparent is that digital business is driven by the same forces as business in general but that one single factor stands out: *value* is not a function of the product or service, is not stable or fixed, and is less and less under the control of providers. *It is a function of the choice space*. In a closed space, such as an industry protected by regulation or limited in its range of offers by asset-specificity, the dimensions of value will be constrained and largely centered on product features and prices. *Digital business is driven by opportunities to expand the choice space*, often intruding on the space of other industries and adding new dimensions of customer, company, and partner value. Four realities of value generation emerge from the history of ultrasuccesses and ultrafades. These are less than proven truths but more than rules of thumbs. They usefully point to principles for defining the value architecture for

Reality 1: The buyer determines value	Given choices, the buyer, not the seller, determines which dimensions of value matter and how offers compare.
Reality 2: Value is always relative and shifting	Value is always relative and shifting, because it is a function of an expanding choice space, driven by a consistent set of historical forces that disturb the business terrain.
Reality 3: Companies leverage ecocomplexes	Companies increasingly exploit the choice space to leverage adaptive ecocomplexes of relationships rather than go it alone.
Reality 4: Entrepreneurs will offer new dimensions of value	The distinctive characteristic of the entrepreneur is to leverage the forces of disturbance to offer new dimensions of value or find new ways to enhance existing ones.

Figure 1. Value Realities

digital business innovation and sustained growth. They are shown in Figure 1.

If the realities point to the answer, what is the question? Basically, it is not what makes digital business new or different, but why, where, and does choice, and hence value, shift? The answer to that question drives the firm's value architecture, its blueprints for resource management that meet today's demands and adapt to tomorrow's uncertainties. *Ultrasuccesses* exploit an opportunity of their time. *Ultrafades* depreciate their annuity over time. Superextenders position to innovate in time by expanding beyond the bounds of the capabilities and context that brought them success.

Three increasingly intersecting historical—noncyclical—forces stand out as opening up the choice space for customers, companies, and ecocomplexes of relationships. While they are unpredictable in their timing, they move in the longer term in the same direction. Regulatory and trade liberalization expand market and supply choices. Technology transforms coordination opportunities in customer relationships, “frenemy” collaborations, and demand chain management. Standardized interfacing of modular processes and components facilitates asset-blending investment that reduces the capital cost and risks of fixed, in-house capabilities via variable cost sourcing. Figure 2 summarizes the dynamics of the forces. It labels them as forces of disturbance. Digital business largely aims at exploiting jolts and fissures in an industry status quo.

The forces shift the dynamics of value creation, since value is entirely a function of the choice space. Control of value is less and less determined by industry boundaries, asset advantages of scale, or research and development capabilities. In many regards, customers rather than the Web killed off the newspaper industry; they decided that they wanted news but didn't need printed papers. Nokia dominated the mobile phone market; customers decided that Apple's design was a

dimension of value that dominated function and price and chose accordingly. As products rapidly commoditize through global supply chain choices enabled by trade liberalization, technology, and modularity, the customer dimensions of value increasingly move from being centered on features and to dimensions of a branded customer experience, with many of these built on standardized interfaces and ecocomplexes.

Amazon and Apple are prototypical examples. If you ask a group of people if any of them have bought a book from Amazon in, say, the past three months, you can expect a large show of hands. Ask who the publisher is and the response will be a blank of ignorance and indifference; Amazon is the brand. It also relies on innovation via interface, linking to two million stores that it doesn't own or run. Apple is an instance of an ecocomplex as experience brand; it doesn't make any of its products, relies on others' content (which is increasingly modular: music, video, and photos) and makes money from third-party apps and commission fees. Fundamentally, digital business rests on the design of customer experience in a context of constantly shifting choices as new players exploit the historical forces of disturbance.

The pace and impacts of these general forces and shifts demand a value architecture that balances a number of otherwise conflicting organizational factors: business model, value engine, and opportunity platform (Figure 3). The focus must be on enabling the innovation after next and then the one after that, given that value will shift. In general, successful companies in digital business have spotted the opportunity of a new or opening choice and built real value but assume that the same value dimensions will hold. They too often look for a business model that will hold, provide value for the customer of today, and source the talent they need to grow. But the very intention of innovators in digital business is that the business model is not an end point, but an interim framework. A question that is neglected by many of the most successful firms is, who is the customer of tomorrow and what will he or

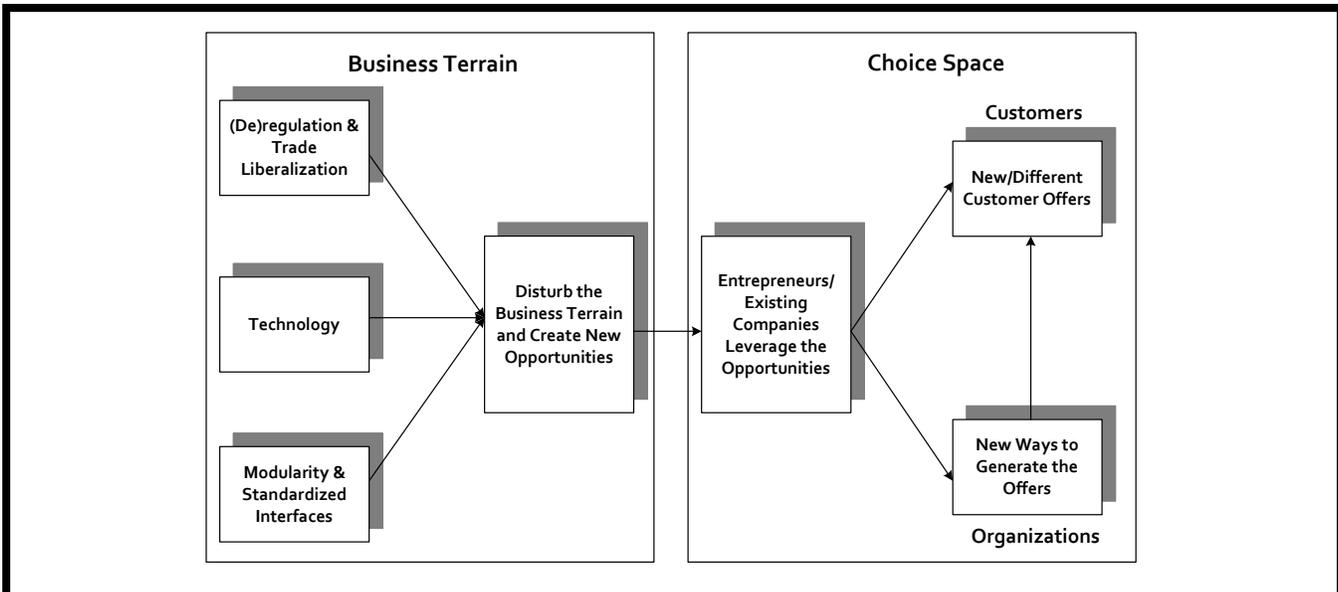


Figure 2. The Historical Forces of Disturbance

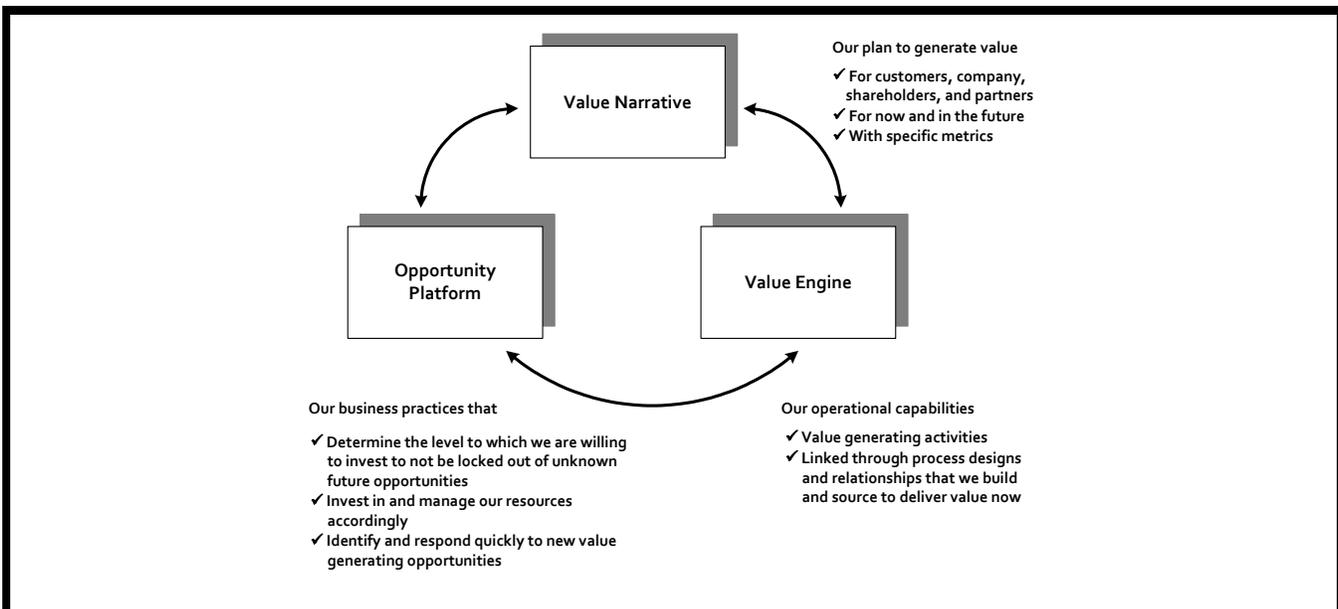


Figure 3. Value Architecture

she really, really value as new choices open up? This might suitably be the headstone on the graves of the newspaper companies.

Very roughly, digital business models aim at spotting opportunities and are customer-led in their views of innovation. This runs the risk of customer value coming at the expense of company value as the firm offers new and more choices and

as the pace of invention fuels commoditization; this is the dilemma in consumer electronics and mobile phones, where every new product is quickly matched, process slashed, and time to market accelerated. The firm must build a value engine that generates company value and is mainly cost-centered. Digital business models challenge business as usual; their value engines have to create a new “as usual.” Amazon stands out, like Southwest Airlines or Walmart, as

both a market innovator and low cost producer. It will be interesting to watch how the value creation wars between Google and Facebook play out, to see the extent to which Google's value engine advantage offsets Facebook's ability to add new dimensions of customer value. Google's advantages include its ownership and leverage of fiber optics capacity, bought at dot-com fire sale prices, plus its data center scale, productivity, and energy efficiency, and its software/hardware capabilities to manage more data than any other organization on earth. Google's estimated costs are one-third that of its main competitors. It is hard to see how the global telecommunications establishment can escape the margin erosion of price wars, data plan hypercompetition, and dependence on fixed assets. The more efficient their value engine, the more value Netflix and Apple generate.

In general, business models have been the focus and source of news in the digital market discussion. The current focus of innovation is generally on business models for digital business. As this example indicates, this is just one determinant of value creation. In addition, a combination of business model and value engine that provides for ultrasuccess today is more than just a little likely to fuel ultrafade tomorrow by the very fact that it is a success. The four realities of value point to a continuing need to adapt to shifts in the choice space. That is hard to do if the firm's resource base is built on fixed assets, stable value dimensions in branding, and reliance on in-house core competencies. The main determinant of ultrasuccesses relatively unobtrusively and suddenly losing their edge is the lack of investment in an opportunity platform. The opportunity platform designs of the new exemplars of innovation that is turned into sustained value are industry-independent and built for flexibility. They rely heavily on asset-smart variable cost sourcing, licensing, and modularity via ecocomplex relationships rather than asset-heavy capital investments. They use this adaptability to enter new markets at low cost and risk, redeploy and re-source capabilities and extend business models.

This has enabled Amazon, for example, to use its platform to take over book publishing, become a leader in cloud computing, and challenge any innovator in any emerging sector of digital media. Li & Fung used its value architecture, which had made it the global coordinator of the apparel business, to move its services into other sectors, including toys and home furnishings. Tesco started out as a discount player in the UK grocery business and is now labeled as Walmart's worst nightmare, one of the three largest global retailers, a leading financial services company, one of the most successful mobile phone firms, and by far the most profitable player in online grocery sales. Oh, and it is the largest seller of "branded" gas to car drivers and the national price-leader. Its loyalty card is the second currency of the entire UK economy.

Tesco's value architecture was designed with the aim of earning the customer's lifetime loyalty, not just selling groceries, at which it is superb. In many ways, Tesco is an opportunity platform readied for the next expansion and looking for the one after that. It is notable that its platform, built for growth, has become key in recovering from the erosion of its basic business as the UK economy has slipped back into recession. Its "dark stores" are a new digital hub for online groceries and it is on track to reach a 50 percent market share in the UK online business.

The erosion of such firms as Dell, Gap, and Sony seem to reflect assumptions about the nature and stability of value that led to underinvestment in the opportunity platform. Capabilities for adaptation were at the margins of both the business model and value engine, investing for "more" rather than "different" in innovation. Need more new products? Beef up the research and development budget. More market power and reach to customers? Expand the technology base. More profitability? Increase outsourcing. Broader markets and products? Make a merger or acquisition.

Digital business will be driven in its next phases by value architectures rather than business models. The starting point for evolving research and practice to aid in the development of new best practices here must begin by taking a fresh view of value. Here is the key assertion for digital business:

Value is entirely a function of choice. Digital business is centered on exploiting the forces of disturbance that open up the choice space. It must, therefore, build the value architectures that accommodate ever-continuing shifts in value.

For the information systems organization, the conversations for innovation must shift to the language and concepts of value creation. A few obvious points are:

- Digital business is marked by innovation through interface: to customers, partners, and suppliers. The IT enterprise architecture determines the platform for interfacing. Hence, choices of technical and standards determine the firm's business degrees of the freedom: its platform opportunities.
- IT is a hub for contracting of relationships and enabling the source of human capital upon which the firm can draw: up to 70 percent of IT budgets are for services; IT needs a new style of talent chain and partner chain management.
- The most fundamental opportunity for IT is to recast the discussion of cloud computing and managed networks to

move highlighting its contribution to the shift from a fixed cost asset base to a variable cost financial structure that substitutes relationships for capital.

- Every firm is now in digital business markets. Looking for a business model or a strategy for technology in this context is an inadequate approach to taking charge of change. The need is for a value architecture for business that is built on digital opportunity.

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COMMODITIZED DIGITAL PROCESSES AND BUSINESS COMMUNITY PLATFORMS: NEW OPPORTUNITIES AND CHALLENGES FOR DIGITAL BUSINESS STRATEGIES¹

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The emergence of the digital business strategy concept has coincided with three other conceptual advances for our field. First, it is increasingly recognized that companies need to strategize not just about product-market segments (Porter 1985), but also about their ecosystems (Iansiti and Levien 2004). These expanded partner networks are typically assembled by “orchestrators”—large, powerful companies at the core of ecosystems. Second, there is growing awareness of the potential benefits of replacing proprietary data exchange conventions with open, Internet-based standards such as RosettaNet’s partner-interface-processes in high tech (El Sawy et al. 1999), MISMO standards in the mortgage industry (Markus et al. 2006), and RFID standards in retailing (Loebbecke and Palmer 2006). Third, there is great interest in the possibilities of shared digital platforms like Salesforce.com and Amazon’s cloud-based hosting services (Loebbecke et al. 2012).

With this short essay, we invite the IS community to consider the implications of *three further conceptual developments* (for a summary, see Table 1). First, we propose the concept of *business community*, consisting of the overlapping ecosystems of competing orchestrators in defined areas of business activity, such as automotive retailing or mortgage lending.

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The concept of business community is useful for understanding why the gains from open standards and shared platforms have thus far been limited. Second, we distinguish standardized and commoditized digital business processes. Whereas standardized business processes are still heavily customizable to an orchestrator’s preferences, we see *commoditized business processes* to be substantially the same across a business community (Davenport 2005). And third, we differentiate between customizable digital platforms that are “shared” by many companies (not necessarily in the same industry) and *business community platforms* that are tailored for use by all members of a business community (Markus and Bui 2012; Steinfield et al. 2011).

We cannot predict the future adoption of commoditized business processes and business community platforms. However, to the extent that these developments materialize, we believe they will have profound implications for companies’ digital business strategies. For instance, these developments may challenge our widely held belief in the competitive advantage obtainable from investment in digitized business processes and digital platforms.

Unit of Analysis: From an Orchestrator’s Ecosystem to a Business Community? ■

Starting in the mid-1980s, strategic IS research focused on individual firms seeking superior performance and “competitive advantage” through the use of interorganizational systems

Table 1. Key Conceptual Developments in Digital Strategy		
	Conceptual Development	
Unit of Analysis	<i>Ecosystem</i> An orchestrator's extended network of partners	<i>Business Community</i> Set of possibly overlapping ecosystems in a defined area of business activity
Digitized Business Processes	<i>Standardized Business Processes</i> Digitized business processes that employ open standards and may be tailored (by selection and extension) to an orchestrator's unique preferences	<i>Commoditized Business Processes</i> Standardized digital business processes performed in common by most members of a business community including competing orchestrators
Digital Platform	<i>Shared Digital Platform</i> Digital platform supporting simultaneous use by multiple companies, each of which can independently customize business processes for its own ecosystem	<i>Business Community Platform</i> Digital platform tailored to the processes of a business community and used in substantially the same way by most community members, including competing orchestrators

designed to lock in customers or integrate with suppliers (e.g., Johnston and Vitale 1988; Pavlou and El Sawy 2006; Piccoli and Ives 2005; Sambamurthy et al. 2003). Familiar early examples include Baxter (Short and Venkatraman 1992) and Brun Passot (Jelassi and Figon 1994).

Current strategic IS research assumes larger units of analysis, such as extended (multitier) supply and distribution chains or “ecosystems,” which are understood as loose sets of organizations engaged in the creation and delivery of a firm’s product or service offerings (Iansiti and Levien 2004). Companies in an ecosystem include not just customers and suppliers, but also, for example, producers of complementary products and services, logistics providers, outsourcers, and financiers. They require interoperability on a large scale, emphasizing the role of data and business process standards (e.g., RosettaNet’s XML-based partner–interface–processes) and the platforms or technologies that support interconnection such as service-oriented architectures and cloud computing.

Theorizing about digital business strategy has often taken the perspective of ecosystem orchestrators, whose position in the ecosystem gives them substantial power to dictate terms to more dependent companies. Examples of orchestrators are original equipment manufacturers (OEMs) in the automotive and high-tech industries and leading consumer products retailers. But partners in an orchestrator’s ecosystem might also be members of additional ecosystems. For example, a supplier of a particular automobile component or subassembly may supply all U.S. OEMs; the respective OEMs’ ecosystems would be at least partially overlapping. The broader one defines the ecosystem concept, the more likely it is to include organizations belonging to multiple overlapping ecosystems. Obviously, entities like ports, public warehouses, customs

agencies, and shipping lines are not the captive partners of any orchestrator. As a result they are much less likely to conform to any orchestrator’s preferences around standards and interconnection technologies.

The possibility of overlapping ecosystems suggests the value of an even larger unit of analysis—a unit that includes peer (competitor or potential competitor) orchestrators and their respective ecosystems. We call this unit of analysis a *business community*. As analytic units, business communities (e.g., the automotive and high tech industry communities) are not collective actors and thus they do not have strategies. However, the digital business strategies pursued by the orchestrators in a business community may have effects that extend beyond an orchestrator’s own ecosystem partners to other community members.

So far, the business community is an important, but under-exploited, context and reference point for conducting research on digital business strategy. To offer some guidance, we now explore two key dimensions of digital business strategy in business communities: digitized business processes and digital business platforms.

Digitized Business Processes: From Standardization to Commoditization?

Even the simplest dyadic electronic interaction among companies requires some harmonization of data definitions and transaction formats. Earlier efforts by companies to develop customized EDI transaction standards (Mukhopadhyay et al. 1995) have given way to more ambitious, industry-wide

XML-based business process standards (Markus et al. 2006). The idea is sound: Individual companies do not have to reinvent the wheel each time they want to connect with a new partner; they can alter their internal systems to facilitate easier interconnection with more of their partners. Adopting standards allows them to take advantage of outsourcing, dynamic reconfigurations of supply chains, and other kinds of stable or *ad hoc* business partnerships (Pavlou and El Sawy 2006; Sambamurthy et al. 2003).

The practice of standards implementation has not quite lived up to its promise. With every orchestrator adopting its own standards, many non-orchestrator companies are forced to employ multiple versions of the same business processes and technologies with different partners. Even in the era of comprehensive industry-wide standards (e.g., RosettaNet standards or GS1's product data synchronization), standards are often customized to an orchestrator's preferred ways of working. This often causes non-orchestrators to bear the costs of performing multiple variations of some business processes. As a result, non-orchestrators often neither fully integrate systems nor harmonize processes with the orchestrators, leading to costs, errors, and delays which reduce the non-orchestrators' and even the orchestrators' benefits.

Concerning the business processes, researchers often distinguish between processes that are unique to each orchestrator's ecosystem and processes that are standardized via use of industry standards and/or commonly used business systems. We call attention to a further distinction: that between standardized and commoditized business processes (Davenport 2005). Processes that are standardized via the use of industry conventions and common systems can still be customized by orchestrators for their own ecosystems. For example, consumer products companies often perform the "standard" collaborative planning, forecasting, and replenishment process using different software tools, forecasting periods, and aggregation rules for each retailer they work with.

By contrast, commoditized processes are performed essentially the same way by all companies. For example, widely used software products like SAP or shared platforms like Salesforce.com may encourage all user companies to perform certain processes the same way, even if the companies do not interact with each other. Davenport (2005) predicted the arrival of such process commoditization on a large scale and foresaw that process commoditization would promote greater outsourcing. By the same token, increased outsourcing and improvisational partnering may accelerate the commonality of business practices across companies and ecosystems. Another potential driver of business process commoditization, we believe, concerns companies' choices of digital business platform.

Digital Business Platforms: From Shared Platforms to Business Community Platforms?

As technology has advanced and technology companies have matured, increasing numbers of orchestrators make use of some shared digital platforms (e.g., Salesforce.com, Amazon's hosting services) that are also used by others, even their competitors. Using such shared platform, each company can independently customize business processes for its own ecosystem. Typically, orchestrators use shared platforms *only* with members of their own ecosystems as they often have great leeway in choosing and tailoring the processes they run on the platforms. Other orchestrators in the same business community may adopt different platforms or take advantage of different tailor-made processes on the platform.

By contrast, digital *business community platforms* (Markus and Bui 2012; Steinfield et al. 2011) are digital infrastructures designed to support interoperable business processes across ecosystems in a particular business community. Tailored to specific business communities (of overlapping ecosystems), they could promote significantly greater commonality of business processes and practices as they are used in substantially the same way by most community members. Examples include NEHEN (the New England Healthcare Exchange Network), MERS (the Mortgage Electronic Registry System), and Nlets (formerly, the National Law Enforcement Telecommunications System). Such business community platforms may support non-procurement related processes, such as health insurance claims processing and medical data sharing, keeping track of mortgage assignments, or facilitating the sharing of information across law enforcement agencies. Or they can also be electronic marketplaces, in which the main processes supported are those related to buying and selling (Soh et al. 2006). Often, business community platforms are initiated by industry associations or consortia, although after startup they may have independent (privately owned or public) management companies. In many cases, they are built and even operated by IT service providers on behalf of their initiators or management companies.

A key difference from shared platforms is that business community platforms support digitized business processes only for qualified members of particular business communities. They have the goal of being used by all overlapping ecosystems in the business community, but do not require members to interact with any community members not of their own choosing. The focus of business community platforms on harmonizing business activities across overlapping ecosystems may promote process commoditization within communities to a greater extent than standards and shared platforms alone.

Discussion

In this opinion piece, we introduced several distinctions that are not frequently found in the literature on digital business strategy (for a summary, see Table 1). We differentiated *business communities*, comprised of multiple, partially overlapping partner networks in defined areas of business activity, from the *ecosystems* of large orchestrators. We contrasted *commoditized* business processes—performed in substantially the same way throughout a business community—from *standardized* business processes that can be tailored to an orchestrator's preferences. And we distinguished *business community* platforms—used in common throughout a business community—from *shared platforms*, which allow orchestrators to configure customized processes for exclusive use with their own partners.

Why do these distinctions matter for research on digital business strategy? We argue that, when ecosystems overlap, the digital business strategies of orchestrators have consequences beyond the boundaries of their own ecosystems. By pursuing competitive advantage or even cooperative advantage through customized business processes and closed (even if shared) digital platforms, orchestrators impose the costs of multiple platforms and process variations on their partners. The resulting inefficiencies in terms of costs, errors, and delays may ultimately harm the orchestrators as much as their partners. They may even offset the performance advantages that ecosystem orchestrators expected to gain by developing digital business strategies in the first place.

A holy grail of digital business strategy is to achieve efficiency without sacrificing flexibility or differentiation. Some scholars argue that XML and Internet-based standards, service-oriented architectures, and cloud computing will enable companies to be both efficient and flexible. By contrast, we wonder whether truly efficient, dynamic business interoperability can be achieved without commoditizing business processes. We also wonder whether business community platforms are the way in which process commoditization and commonality of business practices will first come about. In addition, we wonder whether efficiency and flexibility will be achieved at the expense of competitive advantage from IT, at least as competitive advantage from IT was traditionally conceived, that is, as differentiation achieved via advanced IT use.

We believe the concepts of business community, commoditized business processes, and business community platforms open up a range of important research opportunities related to digital business strategy. Among them are the following:

- First, how much advantage do orchestrators really get from business processes tailored to their preferences? For the sake of argument, we hypothesize that, in business communities with a high degree of ecosystem overlap, orchestrators' benefits of customizing standards-based business processes are outweighed by the costs of partners' inefficiencies and errors. Future research should compare business communities varying in degree of ecosystem overlap on outcomes such as partners' costs and benefits, extent of partners' adoption of standardized digital business processes and business community platforms, and orchestrators' efficiencies and competitive advantages.
- Second, when, how, and why do business process commoditization and/or widespread adoption of business community platforms occur? We hypothesize that widespread adoption and use of commoditized business processes and business community platforms are more likely to occur in business communities with a high degree of ecosystem overlap. Important areas of future research include developing metrics of ecosystem overlap and identifying the other conditions (e.g., history, culture, presence of a 500 pound industry gorilla, etc.) that promote or hinder widespread adoption of commoditized processes and community platforms. It might also be useful to investigate under what conditions commoditized business processes emerge without the use of business community platforms. For example, to what extent can orchestrators' independent use of de facto standard software packages like SAP promote process commoditization across business communities? Which metrics help predict such process commoditization scenarios early enough to prepare the respective digital business strategies?
- Third, what are the consequences of process commoditization and/or business community platform adoption, to the extent that they occur? Here, we believe, a key question is whether and how ecosystem orchestrators can create and sustain competitive advantage through digital business strategy, if and when processes become commoditized and business community platforms become widely used. Further questions are whether and how non-orchestrators can benefit from eventual changes in competitive advantage and whether process commoditization and/or business community platform adoption may even diminish the role and position of ecosystem orchestrators.

In conclusion, we believe that expanding the focus of IS research beyond business ecosystems to business com-

munities calls attention to the little discussed possibilities and effects of process commoditization and business community platforms. This broader focus raises exciting new research opportunities.

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REVEALING YOUR HAND: CAVEATS IN IMPLEMENTING DIGITAL BUSINESS STRATEGY¹

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Digital business strategies (DBS) offer significant opportunities for firms to enhance competitiveness. Unlike the large proprietary systems of the 1980s, today's "micro-applications" allow firms to create and reconfigure digital capabilities to appropriate short-term competitive advantage. In the quest to provide value to customers through digitization, such applications can be efficiently deployed. However, we propose that in the long-term not all digitization is desirable. Indiscriminate digital initiatives through the use of micro-applications by a firm could "reveal its hand" to competitors and erode competitiveness. We propose that a firm's DBS must balance its system—software, process, and information—visibility with the ability to appropriate value from such systems. Through a visibility-value framework, and examples drawn from practice, this article illustrates the tradeoffs involved in making these choices as the firm traverses a dynamic business environment. In doing so, it raises sensitivity to an important caveat in digital environments epitomized by hyper-competition and transparency.

Keywords: Digital business strategy, competitiveness, flexibility, phasing, design, digitization

Introduction

The declining cost of replicating, processing, storing and distributing digits gives firms the ability to digitize products and services, conduct analytics, and ultimately implement business strategies that take advantage of digital economics (Porter 2001).² Digital economics enable digital business strategies (DBS) that leverage a firm's ability to rapidly deploy systems on developmental platforms. However, in doing so, firms incur the risk of exposing their systems to

competitors. Our focus in this article is to raise a note of caution with respect to such DBS implementation.

Many traditional DBS frameworks in the IS literature have a static undertone to discover or influence product-market positions through IT initiatives (e.g., Porter 1996). These initiatives often involved significant in-house development of large-scale information systems (e.g., Merrill Lynch's CMA; American Airlines' SABRE) that were hidden from competitors and difficult to replicate. Today's digital environments differ in two fundamental ways that have profound implications for DBS. First, the digital environment has greater interconnectedness and interdependencies catalyzed by IT that make static analysis difficult and strategic positioning short-lived. Second, the source of competitive advantage is shifting away from large, proprietary systems and toward "micro-applications" that reside on digitally interconnected platforms.

¹Anandhi Bharadwaj, Omar A. El Sawy, Paul A. Pavlou, and N. Venkatraman served as the senior editors for this special issue and were responsible for accepting this paper.

²Porter argues that the Internet provides a better technological platform than previous generations of IT and that it can enhance traditional strategies.

Micro-applications, also referred to as enterprise mash-ups or composite applications, are applications that perform functions ranging from data retrieval (e.g., UPS's package tracking) to data integration from disparate services (e.g., Kayak's air-fare comparison) to more complex applications that create a business process (e.g., AutoSlash, a car rental monitoring application that rebooks a rental when cheaper options become available). Pahlke and Beck (2010, p. 311) define traditional strategic systems as developed through centralized developmental processes, involving a large number of developers, and with full firm control over the quality and processes of innovation (Gawer and Cusumano 2002). By contrast, micro-application development involves new approaches based on orchestration principles, typically on existing platforms (e.g., the Internet or smart phones). Individual software components that are reusable and interoperable can be mixed and matched to meet the demand for larger, more complex applications within days by an individual, a team, an outsourcer or the open source community, to provide agility and competitive advantage.³

Three principal components that comprise the micro-application *system* yield independent or collective sources of competitive value. These are referred to as software, processes, and information (SPI):

Software (S): the application, which could be a product (e.g., an airline checked baggage tracking) or an enabler in the provision of information or services;

Processes (P): defined steps that interact with the software to create a capability (e.g., compile data for mining software);

Information (I): adds value to the firm or to the customer. Information could be an input or output of the software or could be independently provided to the consumer (e.g., customer location to advertisers, or customer tickler when an item becomes available at a sale price).

In contrast with prior work on DBS, our thesis is: *should* the value from SPI be created rather than *can* the value be created? Firms can get carried away by the efficiency and low cost of modular and flexible building blocks of digiti-

³We use the term *micro* to represent the typically smaller applications than large-scale strategic systems. Our focus, however, is more on rapid development and not scale. Therefore, Google's search algorithm and other large systems fall well within our thesis.

zation.⁴ By digitizing processes just because they *can* be digitized, a firm risks "revealing its hand" to competitors who can imitate faster, better, and cheaper (Vitale 1986). Open architectures, web services, and modular technologies, combined with reverse engineering and rapid deployment of applications, especially on the Internet, make it increasingly difficult to protect innovative information systems. This is in sharp contrast to the environment in the 1980s when proprietary strategic systems required thousands of human-hours of in-house application development and remained hidden from competitors.

In today's hyper-competitive conditions, firms should be sensitive to the transparency that make applications susceptible to imitation. Visibility of systems' SPI is a *choice variable*, often underemphasized in research and practice, and should be evaluated for its ability to appropriate value. A firm can appropriate greater value by strategically hiding some and making visible other components of the micro-application's SPI. We present a framework that illustrates considerations for both visibility and appropriability. Our objective is to bring this important aspect of DBS into corporate consciousness.

Tradeoffs in System Visibility and Value

If the system from which the focal firm successfully appropriates value is visible to external entities, then there is incentive for competitors to imitate and appropriate that value. Of course, value appropriation by competitors depends on the system's degree of embeddedness within complementary assets (Pavlou and El Sawy 2006). The focal firm can, however, shield the system to extract supranormal rents but this comes at a cost. This entails costs of protecting the information, customizing the design, and opportunities lost that might otherwise emerge from "openness" in sharing software, processes, and information. Lack of openness is also likely to inconvenience customers' interaction with the firm. Therefore, firms must assess the tradeoff between managing system *visibility* and *value* of micro-applications when formulating DBS.

⁴During the dot com boom there was an implicit bias in favor of greater digitization as business models were handsomely rewarded by venture capitalists and equity markets until traditional concepts of business value caught up with many digital firms.

Managing System Visibility

System visibility indicates the revelatory aspects of the three components—software, processes and information (SPI)—that a competitor can observe, replicate, or improve upon. Thus a key element of system visibility is *what can be discerned* from the visible SPI that makes each vulnerable to imitation. For instance, how an insurance company mines (software) proprietary data to gain insights into customer behavior (information) and then provides a micro-application for customers to customize insurance coverage (process) is less vulnerable to imitation because of its low system visibility. Further, a DBS that leverages unique attributes of the firm, such as a distribution channel, or develops and exploits processes that are hidden from competitors such as Google's search algorithm, are less vulnerable to imitation.

We offer two approaches for firms to manage system visibility: *phasing* (temporal revelation of SPI) and *design* (modular revelation of SPI). Drawing upon real options thinking (Fichman 2004), *phasing* uses the option of planned sporadic releases of the digital application without making the entire digital initiative visible. In doing so, a firm can manage uncertainty and observe competitors' response before exercising its options in the next phase. When uncertainty is high, the pioneer firm can phase its system in such a way that the complete orchestrated plan remains ambiguous to its competitors. It can increase visibility by opening its hidden software, processes, or information, or commoditize the application when the uncertainty is resolved. Consider Medical Health System (MHS)⁵ that followed a phased approach to digital application visibility through a comprehensive tracking application. It monitored treatment and outcomes at various points during the patient's hospital visit, yielding valuable performance metrics. MHS' DBS leveraged this information through a phased approach. By exploiting a portion of process level data, it now broadcasts hospitals' real-time emergency room (ER) patient wait times on roadside billboards or via text messages. This is a low visibility DBS phase because MHS does not reveal how it tracks specific processes behind ER wait times, yet it has enhanced competitive value by appealing to patients who need immediate care. While MHS awaits competitors' response, it continues to analyze patient data, for example, from social media including an application that engages parents by providing information regarding nutrition, how-to videos, and available hospital services. This information can be exploited in future DBS phases if MHS feels that it can generate competitive value. It can accelerate or modify phasing depending on competitors' response.

⁵Name disguised.

A second approach to managing system visibility is through *design*. Drawing upon the system design perspective (Ramachandran and Krishnan 2008), modular design of a system can be the basis for extracting value by controlling visible and the invisible parts of the SPI. In a modular design, a part of the system can be made visible to competitors while another invisible module remains the real source of value. Consider Netflix that uses Cinematch, a strategically designed movie-ratings system, to make movie recommendations to its customers. The visible part of the system allows users to provide inputs at various points during the online transaction. Although competitors can replicate the interface, the real value lies in the hidden module that comprises vast amounts of data and algorithms that Netflix has refined over the years.

Managing Value

Along with system visibility (low versus high), firms can identify and control the source of value from the system. With low visibility, the value appropriation (low versus high) depends on whether the firm can generate value from proprietary SPI. With high visibility, competitors may imitate SPI but still not appropriate value if the real source of value is in the way SPI leverages the unique complementary assets of the firm. This allows the focal firm to be more flexible in opening up its system. For instance, Goodyear's retail business uses micro-applications for "Search-and-Comparison" and a "Request-for-Quote" on its website to help price-conscious customers choose the right tires and then direct them to an online "Dealer Locator" tool. Although the search tools are common micro-applications, they help Goodyear appropriate value through integration with its distribution and retail outlets. By using digital applications to leverage the physical assets of its distribution systems, Goodyear can be far more flexible in opening up its system and still appropriating value. Similarly, some major investment services firms reveal their system and processes by putting a plethora of micro-applications on their websites but draw synergistic value through their national network of physical offices. Their high-end clients set up online portfolios and then meet investment counselors for advice. While competitors can appropriate some value by imitating the online system, investment services firms gain significant value in provision of high-end services by leveraging the synergy between their micro-applications and physical assets.

System Value–Visibility Framework

The two facets discussed above are presented as a value–visibility framework in Figure 1 to illustrate how a firm can manage visibility and appropriate value. It is important to

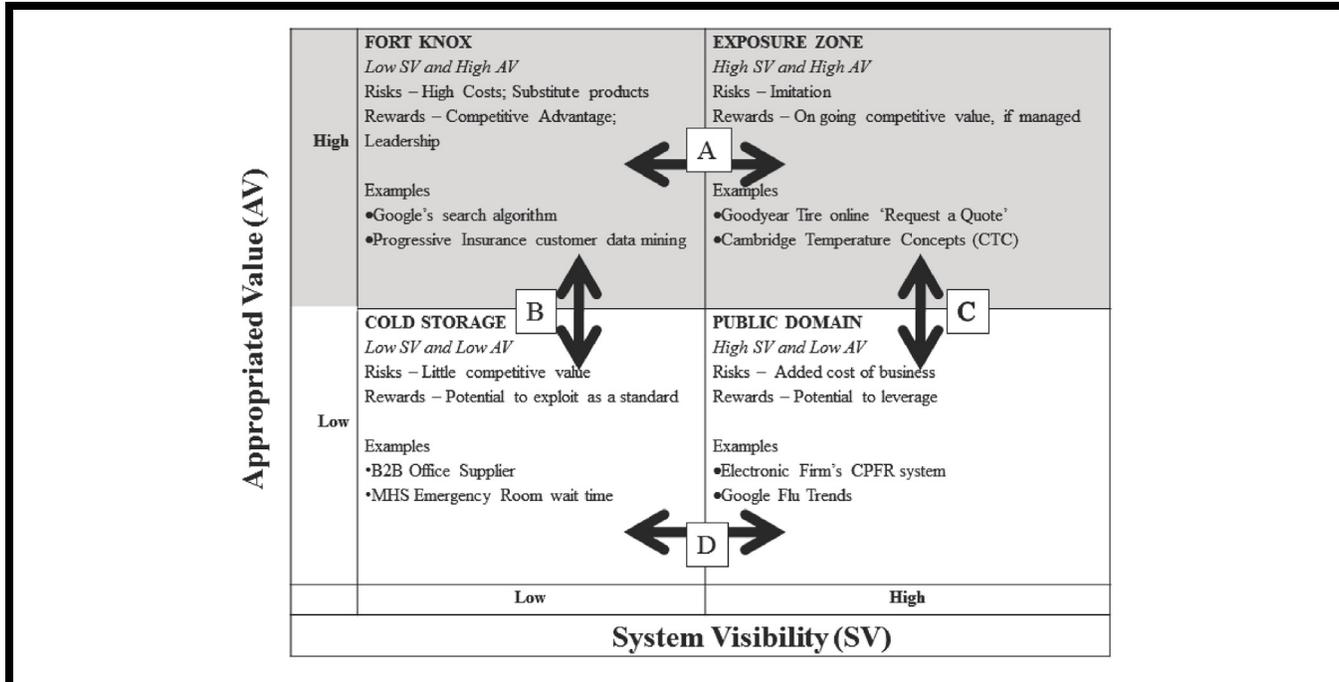


Figure 1. Value–Visibility Framework

note that the unit of analysis is a *system* and its SPI components. Given that firms manage a portfolio of macro- and micro-applications, a firm could have multiple application systems that can be mapped onto the framework’s grid. The x-axis, System Visibility (SV), represents the extent to which SPI is visible to customers and competitors. The y-axis, Appropriated Value (AV), represents the extent to which the focal firm can appropriate value.

In Figure 1, the top left cell, *Fort Knox* (low SV, high AV), is a desirable position as the firm appropriates value from a “hidden” system, such as Google’s search algorithm, which it zealously guards, or Progressive Insurance, which mines customer data to develop new insurance products. If the system fails to yield value, the application system slips into *Cold Storage* (low SV, low AV), where investments to protect system visibility may not yield commensurate returns. In the top-right *Exposure Zone* (high SV, high AV), firms reveal parts of the system to appropriate “return on visibility” openness benefits also proposed as open innovation (Chesbrough 2007). If the system does not create value, it could slide into *Public Domain* (high SV, low AV), where appropriated value goes to the consumer (not the firm) and the system becomes a part of standard business practice.

In a dynamic environment, however, it is more appropriate for firms to think of how systems move vertically and horizon-

tally within the grid. Firms can orchestrate movement in the grid but in many cases systems “drift” into other cells of the grid due to competitors’ action or technological changes. The extent to which a firm’s movements are “managed” will cause greater value to be realized from the DBS. In summary, when *managing system visibility*, firms facilitate horizontal movement across the grid (i.e., sustain increased appropriated value through phasing and design). When *managing value*, firms facilitate vertical movement through the grid (i.e., high appropriation through proprietary value and complementary assets). By managing the four movements—marked as A, B, C and D in Figure 1—firms can appropriate higher value as articulated in the following questions for each movement.

Movement A

Key Question: *Can the focal firm generate a return on its system visibility?*

Movement: In the left part of the grid, a firm can appropriate value by hiding its system. In the right part of the grid, the firm increases the visibility of the system’s SPI. When competitors get around patent protections or reverse engineer the application, the *Exposure Zone* usually yields short-lived value followed by a slide to *Public Domain*. However, a firm could also manage this movement by phasing or design. The

firm could appropriate higher value by increasing visibility of the system than by hiding the system. In some cases, increased visibility has little downside because the system is part of a broader system of complementary assets that is difficult to replicate by competitors.

Illustration: Cambridge Temperature Concepts (CTC) developed a technology for high precision temperature measurement (*Fort Knox*). Building upon this technology, it developed a noninvasive micro-application body patch human fertility monitor. CTC exposed its temperature measurement technology (*Exposure Zone*), which captures and transmits changes in a woman's body temperature. Yet, it created value from this visibility by analyzing a woman's temperature patterns and by informing her of an optimal time for conception. Further, the database, which CTC keeps protected, remains an increasingly rich repository to build future instrumentation products.

Movement B

Key Question: *Can the focal firm appropriate value in the future from low application visibility?*

Movement: The upper half of the grid represents appropriated value from proprietary SPI or a capability. In the lower half, value appropriation deteriorates or fails to ensue. Firms usually don't voluntarily transition an application to the lower half; market forces or insufficient investments lead it there either because the SPI has limited or no proprietary value or competitors have created better value through other substitutable means. Firms with systems embedded in complementary assets are likely to hold their position in the upper grid.

Illustration: A large office supplies company invested in a neural pattern-based data mining software application. The software, coupled with carefully conceived data collection from customers, allowed the company to compile granular cost reports across product lines. The firm was able to appropriate significant value from its business-to-business system, while guarding its external visibility. However, a competitor partnered with another analytics company with superior information and built a better B2B business. The focal firm's application slid into *Cold Storage* because it was no longer viable to protect system value.

Movement C

Key Question: *Can the focal firm appropriate value from high system visibility?*

Movement: In the top-right part of the grid, firms can generate a return (e.g., in the form of innovation) on carefully managed system visibility. In the bottom-right part of the grid the system is visible, making it difficult for an individual firm to appropriate value. In some cases, this downward movement is beyond the firm's control as competitors may be in a position to appropriate higher value from the application. Some firms with capabilities beyond the SPI might have an easier time staying in the upper grid. However, movement C could also be a part of a strategy where the focal firm fosters imitation of the application for public use because it benefits from its broader use, for instance, by expanding its *Fort Knox* applications or by taking advantage of network effects.

Illustration: Having exposed its precision temperature monitoring micro-application (discussed in Movement A), CTC faces a risk of sliding the application into the *Public Domain* if competitors replicate its functionality. CTC may strategically choose a point in time and expose the temperature monitoring application to let it become an industry standard. CTC is in a position to leverage its database and the knowledge of expectant mothers' use of monitoring apps residing in *Fort Knox* to extract value from future applications for prenatal diet, maternity supplements and mitigating pregnancy risks.

Movement D

Key Question: *Is it worthwhile to protect SPI when limited value can be appropriated?*

Movement: In *Cold Storage* firms protect system visibility but with little or no immediate appropriated value, ostensibly for future returns. In *Public Domain* firms open the system, possibly for industry-wide adoption. In both quadrants the firm does not appropriate significant value because the cost of protecting SPI might not be favorable. Given that path D is a lateral transition into continued low appropriated value, it is unlikely to be a firm's priority. However, under certain conditions this path can benefit the firm's DBS if it helps to exploit its other, less visible valuable applications within *Fort Knox*. Reversing course is another actionable way out of *Cold Storage* (path B) but this entails bearing the costs of rebuilding the system and must be balanced against the potential for new value appropriation.

Illustration: A leading electronics firm developed proprietary data exchange and process standards for Collaborative Planning Forecasting and Replenishment (CPFR), a digital application to synchronize its production with retail sales at sellers. Despite protecting its proprietary system, its competitors were able to recreate their own versions of CPFR and

the electronics firm's application slid into *Cold Storage*. To avoid the backlash from retailers having to deal with disparate CPFR systems, the electronics firm chose to move its CPFR to *Public Domain* by opening its data exchange and process standards. The electronics firm will leverage the learning from CPFR to further refine its processes and exploit its vendor-managed inventory applications currently residing in *Fort Knox*.

It should be noted that while we have assumed that the *software*, *process*, and *information* (SPI) have low or high visibility together, in practice each of the SPI components could be managed independently. This is tantamount to representing the value-visibility framework with three separate grids, one each for S, P, and I. For instance, Netflix holds its in-house algorithm-driven software, Cinematch, in *Fort Knox* and extracts value by recommending movies to customers. To thwart competitors' attempt to imitate or to improve the predictive ability of Cinematch, Netflix increased information visibility by exposing a dataset of 100 million movie ratings in *Exposure Zone* as part of a US\$1million contest. By carefully managing its *information* visibility, Netflix is able to appropriate value from open innovation by customers—which has resulted in a significant improvement in its algorithm. (See the Appendix for illustrations of inter-grid movement.)

Implications

Today's competitive advantage is based on a succession of short-term advantages through digital initiatives that are a part of broader DBS. The ease of implementing DBS through Lego®-like micro-application systems allows firms to construct powerful digital initiatives. There is an inclination on the part of business strategists to pioneer high digital content products and services in the hope that their firm can gain first mover advantage. While such moves have indeed benefitted some firms, it is important to be sensitive to "revealing your hand" and the signal that these application systems, and their SPI, sends to competitors. A short-term advantage may come at the cost of long-term value.

Our value-visibility framework has several implications. First, we sensitize firms to the use of system visibility as a tool that covers a gamut of value appropriation tradeoffs ranging from proprietary value to open innovation. We propose that managers should raise questions in their strategic IT planning forums about how to selectively expand system visibility such that it extends current sources of value or create new ones. Second, firms should examine their system components for return on visibility. In doing so, the risk of "imitability" of components can be assessed through embeddedness

within the firm's complementary assets. Firms can strategically identify SPI components of their key digital applications and manage visibility such that their actions can expand overall value. Third, using our value-visibility framework, firms can aggressively seek to disrupt competitors' value (D'Aveni 1999) by regulating SPI visibility of their applications on their own terms, for example, by phasing and modular design. Finally, firms should not hesitate to let the SPI of an application slide into *Public Domain* if they are in a position to leverage complementarities, such as physical assets, technical know-how, joint ventures, and patents, particularly if such an action also erodes competitors' positions.

There are several research opportunities for further exploration. First, our thesis that all digitization is not necessarily advantageous needs to be further examined through contemporary cases in the context of emerging theories of competitiveness. Second, our conclusion that digitization can expose a firm to unwanted risks by signaling its high value processes or information needs to be further validated, for example, by modeling risk components of software, processes, and information. Finally, our proposed framework suggests that the ratio of value appropriation to system visibility can serve as a useful construct both at the firm and the industry level in the study of strategic IT systems. Future research can test conditions of high or low system visibility and how firms can maximize value.

Conclusion

Although IS research has dealt with topics of sustainability (Mata et al. 1995) and commoditization (Carr 2003), the importance of system visibility in the context of DBS requires greater consideration. We believe that this is an increasingly important message for forward-looking firms in environments where digital technologies make it easier to piece together business applications, hypercompetition reigns and competitors can capitalize on product-market gaps, and open architectures and sourcing, thus making it easier to imitate. In deploying digital initiatives, firms should evaluate tradeoffs between information content and competitive content, otherwise they risk destroying profits and stifling innovation.

The framework described in this essay offers an approach for firms to examine and evaluate issues of system visibility and appropriation of value. In that sense our goal is modest but, in our opinion, critically important. We aim to sensitize firms to the visibility caveat as a consideration in digitization. Appropriating value through visibility versus proprietary system is a fundamental tradeoff that needs to be carefully evaluated. Our framework provides a tool to begin such an assessment.

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Appendix

Inter-Grid Movement with Software, Process, and Information in Separate Grids ■

We present three scenarios of inter-grid movements. For simplicity, we present one such movement in a graphical illustration (Figure A1).

Scenario 1: Software in Fort Knox and Information in Exposure Zone

In this scenario, companies protect their software assets, but use information judiciously to increase their value. Figure A1 illustrates online movie rental provider Netflix's movement between *software* and *information* components. The in-house algorithm-driven software, Cinematch, is a treasured tool that resides in *Fort Knox* and recommends movies to Netflix customers. To thwart competitors' attempts to imitate, and to improve the predictive ability of Cinematch, Netflix increased *information* visibility by exposing a dataset of 100 million movie ratings (in *Exposure Zone*) as part of a US\$1 million contest.⁶ The winning team improved the predictive ability of the Cinematch algorithm by 10 percent thus offering significant value appropriation to Netflix. By carefully managing visibility, Netflix appropriated greater value from data that

⁶The contest was called Netflix Prize. More information is available at <http://www.netflixprize.com/>.

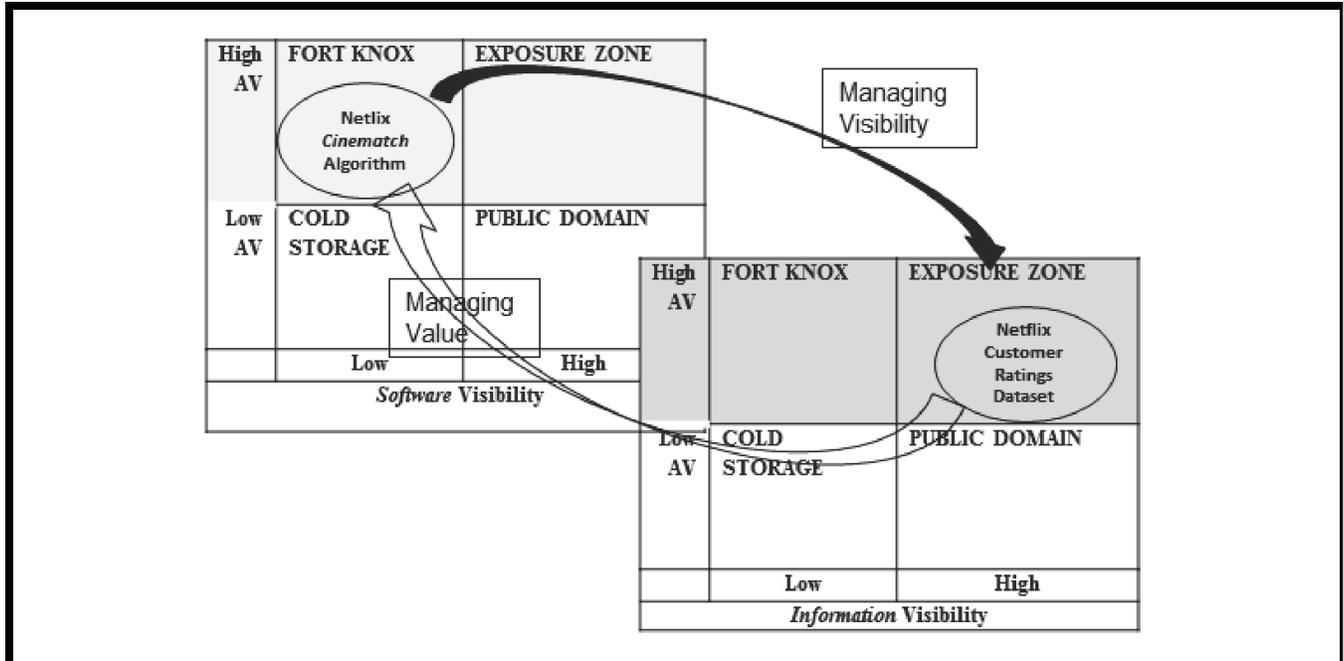


Figure A1. Movement Across Software and Information Grids Shown in Scenario 1

would have otherwise remained hidden in *Fort Knox*. Although by exposing the data Netflix bore some risk of competitor imitation, it managed value by improving the algorithm that was deemed to yield higher net returns.

Scenario 2: Information in Fort Knox and Software in Exposure Zone

In a reverse of Scenario 1, in this scenario a firm opens up its software in order to capture better information. In the case of a fertility monitor micro-application, called Duo-Fertility, CTC increased the visibility of its hidden precision measurement software, thus exposing it to competitor imitation. But it managed the value from information in its database resulting in analytics that remain protected in *Fort Knox*. CTC’s future value may emerge from building superior products by refining instrumentation, understanding differences in human physiology, and expanding into other clinical and health maintenance domains.

Scenario 3: Software in Public Domain but Process in Exposure Zone

In this scenario, firms capitalize on the complementarities between applications and physical assets to manage value. Due to inimitability of assets, such firms are less concerned about managing visibility. Therefore, firms can focus upon managing value by configuring SPI components in high visibility quadrants (*Exposure Zone* and *Public Domain*). The Goodyear Tires’ micro-application software “Search and Compare” (mentioned in the paper) uses automobile models, driving and performance conditions, and other specifications and is built on commonly used e-commerce tools that reside in the *Public Domain*. This micro-application links customers to “Request a Quote” and “Dealer Locator” applications that can expose Goodyear’s process of supply and distribution to customers as well as to competitors. However, Goodyear Tires manages value by leveraging its warehouses, dealerships, and tire replacement facilities through managing higher software and process visibility.