

**THE CASE FOR ADAPTIVENESS IN E-BUSINESS:
INNOVATION ADOPTION, ECONOMIC SCOPE, AND VALUE CAPTURE
THROUGH THE STRATEGY OF SENSE-AND-RESPOND**

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The rise of the Internet has resulted in an e-business revolution, as enterprises, both for-profit and not-for-profit, are transformed through information. The current practice of management has its roots in the beginning of the industrial revolution. Is the approach to strategic management created in the industrial age still applicable in the "new economy"?

The rapid change in e-business can result in a number of uncertainties: whether customers will adopt innovations; what scope of products and services for customers is economically desirable to be produced; where the enterprise can capture sufficient value to produce a profit. Challenges such as these occur in a complex economic environment resulting from the interaction between information assets and network forms.

In *Adaptive Enterprise*, Steve Haeckel prescribes a new, generic model for organizational adaptiveness at large scale that is particularly relevant to e-business. In this model, accountable roles sense the value sought by an individual customer, and respond through a deliverable produced with a design combining a set of modular capabilities. This approach to strategy, structure and governance is uniquely suited to cope with an environment of rapid, unpredictable change.

E-business strategists should reconsider their approach to strategic management. The sense-and-respond organization is a design as an adaptive, open, purposeful, social system.

Keywords: e-business, information, network, enterprise, sense-and-respond.

1. INTRODUCTION

IBM coined the term "e-business" to talk about a broader, more powerful set of changes. About a new mandate: The requirement to explore -- in every institution in the world -- new models, and either validate them, or discard them. All kinds of models: business and financial models, new models for the way ideas move across an enterprise, for

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marketing and distribution, for the way governments deliver services, schools teach and doctors heal.¹

Does an enterprise embarking on the journey to become an e-business need a different strategy? Perhaps it's a different *approach* to strategy that is needed.

This article presents a case that e-business requires a specific type of strategy: strategy as the design of an adaptive system. This case is presented in three sections.

1. What new challenges to strategic management are prominent to e-business?
2. How are the economics underlying e-business different, and how do they impact strategic management?
3. How would a strategic management framework that adapts to these challenges differ from traditional strategic management?

Traditional strategic management is positioned as a make-and-sell approach. An alternative strategic management framework, the sense-and-respond organization, is proposed as an alternative for large-scale enterprises in the rapidly changing, unpredictable e-business world.

2. INNOVATION ADOPTION, ECONOMIC SCOPE, AND VALUE CAPTURE ARE MAJOR UNCERTAINTIES IN E-BUSINESS STRATEGY

What new challenges to strategic management are prominent to e-business?

Traditional, industrial age businesses operated in an environment of stability. The e-business environment is one of continual, accelerated change. Challenges that have become prominent in e-business include:

innovation adoption, i.e. Will innovations introduced by our e-business become widely adopted, over incumbent alternatives?;

economic scope, i.e. What breadth of products, services and/or experiences should customers look to our e-business to provide?; and

value capture, i.e. How can our e-business capture a profit, as a portion of the value created for the customer?

These challenges are relevant for industrial age businesses, but their strategic horizon for e-business is compressed into months or weeks. Each of these three challenges is discussed in more depth individually, and then in combination.

2.1 The Customer Adoption Of Innovation Can Be Uncertain

Innovation is a constant in the e-business marketplace. Clayton Christensen categorizes innovations as either:

¹L. V. Gerstner, Jr., "Address at Finance Conference 2000: The New Economy", Boston College, March 6, 2000.

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sustaining innovations, that "improve the performance of established products, along with dimensions of performance that mainstream customers in major markets have historically valued," or

disruptive innovations, "that result in worse product performance, at least in the near-term²".

In his framework, organizations fail to create appropriate strategic responses to innovations introduced in the marketplace.

Disruptive innovations in the early stages of their development have features that an existing customer base may not value highly -- such as cheaper prices, improved simplicity, smaller size or greater convenience -- but may be attractive to a new set of customers.

Sustaining innovations incorporated into products continue to increase value to existing customers in small increments. The trajectory for the disruptive innovation eventually outperforms the sustaining, but successful adoption is uncertain.

Established firms have little incentive to rationally invest in the disruptive innovation: they generally promise lower margins, not greater profits; they emerge in new or insignificant markets; and existing customers typically don't want, and can't initially use the disruptive innovation. Companies that listen most intently to their existing customers, who focus on sustaining improvements, are thus unable to build a case for adoption until it is too late.³

These ideas were developed by Clayton Christensen, specifically in relation to changing technologies. They can, however, be extended to a larger context. Adrian Slywotsky argues that innovations in technology are no longer the key to success. It is innovations in business designs that produce value for customers.

[... Technology] alone is no longer the fundamental engine of value growth. One reason for this shift is that, in many industries, the rate of breakthrough technological innovation is slowing. [...]

The second reason is that rapid imitation limits the value creation cycle of *any* technological breakthrough. [...] As fast followers rapidly imitate and distribute breakthrough products, price and gross margins collapse⁴.

Breakthrough technology is not going to save the day. We have entered the age of business design⁵.

Although the scope of the argument has broadened from innovation in technologies to innovations in business design, the challenge to an e-business is the same. The enterprise

²Christensen (1997), p. xv

³Abridged from Christensen (1997), pp. xv-xviii.

⁴Slywotsky (1996), pp. 22-23.

⁵Slywotsky (1996), p. 25.

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faces the dilemma of staying with sustaining innovations that satisfies existing customers, but may miss the market for new customers; or risk jumping to a disruptive innovation with a more uncertain emerging customer set, while giving up short-term profitability with an established customer base.

2.2 Appropriate Economic Scale And Scope Can Be Uncertain

How should an e-business grow? Enterprises can grow either by exploiting economies of scale, or economies of scope⁶.

Economies of scale are achieved by using an asset to produce more of a single output. Through the increase in volume of products or services of that single output, per-unit costs decline, and more customers will be attracted.

Economies of scope are achieved by using an asset to produce different types of outputs. Through the increase in the number of outputs produced using the same asset, per-unit costs decline.

Economies of scope are common with intellectual capital goods, which have high development costs, but low replication costs. Software can be produced and sold in this way: development of a library of software objects or procedures requires an investment in research and invention, but those assets can then be reused in a number of different applications. Economies of scope are also present in the acquisition and retention of customers. There's an adage that it costs seven times more to acquire a customer than to retain an existing one. Once a relationship has been established between the enterprise and a specific customer, the incremental cost to sell more things to that single customer is relatively low.

The strategy of pursuing economies of scale is implicit in approaches such as *crossing the chasm*, as described by Geoffrey Moore⁷. In the early market stages for a product, first to adopt are innovators and technology enthusiasts, who are interested in newness and pay with their time as "testers". Next are early adopters, who are prepared to contribute internal resources towards high-risk, high-reward propositions, but require of "hand-holding" by the supplier. To gain economies of scale on a new technology, the enterprise must "cross the chasm" to the early majority segment of pragmatists. Per-unit costs decline rapidly as the volume of products increases, if this segment is captured. "Crossing the chasm" puts product first, and customers second. Once a market adoption segment for the specified product has been exploited, those customers are abandoned as a new customer segment is sought. Economies are achieved by attaining a different scale.

⁶Economies of scale and economies of scope are discussed in Peppers & Rogers (1993). They apply economies of scope specifically to information about customers, but refer to Teece (1980) for a more general definition, based on know how.

⁷See Moore (1991)

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Economies of scope are implicit in approaches such as *mass customization*, as described by Michael Shank, Joe Pine, Bart Victor and Andrew Boynton⁸, and in *one-to-one marketing*, by Don Peppers and Martha Rogers.⁹

Mass customization is one strategy in the "dynamic stability" model, where a product is created dynamically through a set of static business processes. This capability requires organizational transformation through intermediate stages of invention, mass production and continuous improvement. When business processes are static, the production of any combination of product features and/or functions to satisfy a customer's personal choice has a relatively constant cost.

One-to-one marketing requires establishing a capability to solicit and analyze information about the customer's needs and tastes. The function of this information base is to find or anticipate products uniquely desired by each individual customer. The ultimate demonstration of a one-to-one enterprise is one that understands what a customer desires, even before he or she explicitly articulated it.

In these strategic approaches, the customer is chosen first, and retained by responding with a mix of products and/or services that will satisfy their individual interests.

The enterprise needs to be clear whether it is pursuing economies of scale, or economies of scope. Steve Haeckel differentiates these strategic approaches as games against competitors (through economies of scale) versus games with customers (through economies of scope)¹⁰. In the former, the risk is that the enterprise can't maintain its market presence in the face of competitors introducing alternative disruptive innovation at lower costs. In the latter, the risk is that the enterprise doesn't truly understand its customers at the one-to-one level, and is unable to capitalize on its relationships by responding with appropriate products and/or services.

2.3 The Value Captured From Customers Can Be Uncertain

Profitability in an e-business changes over its life cycle. Profits can be sought either by finding a proposition where the cost of raw materials is low and the opportunity for markup is high; or by finding a proposition where the value to a customer is relatively large, and there is a good opportunity to capture a significant portion of that value.

The product-driven or technology-driven company maintains its profit margins through scarcity. When the distinctive advantage of product or technological superiority is lost, prices are bid down, and profitability is lost. As described by Adrian Slywotsky & David Morrison, the value-driven company maintains its profit margins by extending the range of offerings to the customer¹¹. In addition to the base function provided by a product, it may add on ancillary features or services such as financing, or seek other paths to market

⁸Shank (1993), builds on the foundations of mass customization, as described by Pine, Victor and Boynton (1993).

⁹Peppers & Rogers (1993) popularized the term "one-to-one".

¹⁰Haeckel (1999), Chapter 4 introduces the terms "games against competitors", as compared to "games with customers".

¹¹See Slywotsky & Morrison (1997).

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through alliances or licensing. Value capture is sustained, in the long term, through the development of strategic control points, based on knowledge about the customer.

Value capture is measured at a single point in time; value migration recognizes that the value that the enterprise creates and controls changes over time¹². Enterprises must maintain vigilance that the value they provide is not being eroded as competitors introduce new business designs and value propositions. Competitors displace an incumbent by taking over part or all of the customer's value system. The market instability in e-business continually threatens the financial viability of an enterprise, as value migrates elsewhere.

2.4 These Uncertainties Are Symptoms Of The E-Business Environment

The three challenges of innovation adoption, economics of scope and value capture are not just one-time changes, but are part of the everyday environment for e-business. Independently, they are each a significant challenge to strategists. Combined, they produce rapid, unpredictable change that continually tests the viability of the e-business model or design. In the next section, we argue that they are symptoms of more foundational changes in the underlying economics.

3. AN ENVIRONMENT OF NETWORK E-ECONOMICS MAKES UNPREDICTABILITY THE NORM

How are the economics underlying e-business different, and how do they impact strategic management?

If strategists could create treat the symptoms of innovation adoption, economic scope, and value capture, would this be sufficient to reform strategic management? Perhaps not. Strategy is created at the level of the enterprise. In the environment in which the enterprise plays, there's a larger context of economics at play. Some call this the "new economy". We prefer to name this phenomenon as "network e-economics".¹³

3.1 Network E-Economics Results From The Interaction Of Information Assets With Network Forms

Network e-economics results from the interplay between the economics of information, and the economics associated with network forms. In contrast to chains or hierarchies that are structured linearly, network forms allows people or things to connect to each other in numerous ways, either directly or through a number of alternative links. Neither information nor the concept of network forms is new. However, the explosion of connections brought on by the critical adoption of the Internet brings new opportunities and threats. The properties of information become even more pronounced as information has become digitized, and therefore easier to transmit. The network form impacts not

¹²See Slywotsky (1996).

¹³Tapscott (1996) has a similar concept, called internetworked intelligence.

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only the interactions and linkages between technologies, but also the connections between organizations, and between people.¹⁴

3.11 Physical assets deplete or depreciate with in use; the value of information assets tend to accrete with use

The way in which information assets have value can be contrasted to physical assets. Physical assets have the greatest value before they're used, and their value depreciates with use. Information assets, on the other hand, have no value until they are applied.

Rashi Glazer describes the differences in properties between physical assets and information assets.

Any discussion of an information or knowledge theory of value must begin with an analysis of the particular attributes of information as a commodity. The typical economic good displays such properties as divisibility, appropriability, scarcity, and decreasing returns to use. By contrast, information as a commodity differs from the typical good in that (1) it is not easily divisible or appropriable (i.e., either I have it or you have it); (2) it is not inherently scarce (although it is often perishable); and (3) it may not exhibit decreasing returns to use, but often in fact increases in value the more it is used; (4) unlike other commodities, which are nonrenewable and with few exceptions depletable, information is self-regenerating or feeds on itself so that the identification of a new piece of knowledge immediately creates both the demand and conditions for production of subsequent pieces.¹⁵

Thus, an e-business that hoards -- rather than shares -- information, may not be taking full advantage of its assets. Instead of conserving the asset, which might be done with a physical good, an e-business should look for ways in which it can both exchange and exploit the value of information in application.

3.12 Network forms change the economics of industrial organization

Traditionally, organizations have been considered either from a vertical perspective (as a hierarchy of authority) or from a horizontal perspective (as a value chain). Authority, in a linear -- either vertical or horizontal -- chain, is no longer a reasonable representation of the marketplace.¹⁶ Network forms can often mean co-opetition, i.e., other organizations in the e-business sphere than can simultaneously be suppliers, customers, alliance partners and competitors.¹⁷

In the theory of the firm, or transaction cost economics, conditions are considered where an internal organization of agreements (as hierarchies) is superior or inferior to "free"

¹⁴Tapscott (1996) extends these ideas in his description of the "new economy" as both a "digital economy" and a "knowledge economy". "This is an age of networking not only of technology but of humans, organizations, and societies." [p. 7-8]

¹⁵Glazer (1993), p. 101. A similar citation appears in Glazer (1993).

¹⁶Ogilvy (1989) discusses heterarchy, where the integrated organization gives way to networks of organizations.

¹⁷The term "co-opetition" was popularized by Brandenburger and Nalebuff (1996)

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market mechanisms (as networks).¹⁸ Greater uncertainties lead to an industry structure where internal hierarchies are dominant. Networks present alternatives by increasing the opportunity for a large number of exchange relationships. If trust (as opportunism) is an issue, long-term alliances may become an alternative structure. In the rapidly changing e-business environment, however, networks are generally preferred over internal hierarchies for their greater speed, and the ability to maintain skills and competencies.

3.13 E-business operate in an environment of network e-economics: the combination of network structures and (electronic) information

The traditional way to think about industrial age businesses is as a collection of physical assets. In network e-economics, however, it's not the physical assets that are the challenge; it's customers, and information about the customers that is the challenge. What would it mean if we instead thought about e-business as a collection of information assets? The enterprise could be a single organization, or multiple organizations, through which a single contact is made with a customer. The information from customers could be shared across multiple capability providers in a social network based on information.¹⁹

This world of network e-economics is one of increasing returns, rather than decreasing returns. Brian Arthur differentiates the two worlds.

[... We] can usefully think of two economic regimes or worlds: a bulk-production world yielding products that essentially are congealed resources with a little knowledge and operating according to Marshall's principles of diminishing returns, and a knowledge-based part of the economy yielding products that essentially are congealed knowledge with a little resources and operating under increasing returns.²⁰

In this world, the dominant enterprise plays in a "winner takes all" game, and marginal firms fade into obscurity. The game is different under network e-economics.

In fact, the style in the diminishing-returns Halls of Production is much like that of a sophisticated modern factory: the goal is to keep high-quality product flowing at low cost. There is little need to watch the market every day, and when things are going smoothly, the tempo can be leisurely. By contrast, the style of competition in the increasing returns arena is more like ... casino gambling, where part of the game is to choose which games to play, as well as playing them with skill. [...] How much to play? you ask. Three billion, the croupier replies. Who'll be playing? We won't know until they show up. What are the rules? Those'll emerge as the game unfolds. What are my odds of winning? We can't

¹⁸The rebirth of economic research into the theory of the firm, as transaction cost economics of markets and hierarchies, was spurred by Williamson (1975). An organizational failures framework was developed, related to uncertainty (given bounded rationality) and small number exchange relationships (with opportunism).

¹⁹Ticoll, Lowy & Kalakota (1998) describes this as an e-business community. "[Companies] must work together to create online networks of customers, suppliers, and value-added processes. The result is what we called the e-business community, or EBC." [p. 20]

²⁰Arthur (1996), p. 103.

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say. [... The] rewards go to the players who are first to make sense of the new games looming out of the technological fog, to see their shape, to cognize them.²¹

The financial rewards in this game are unclear. It's impossible to forecast an ROI. The winner will be the one who is able to establish market leadership early, invests to capture the market, and reaps profits later. The future is unpredictable. Today, an organization could be the hub of the network; tomorrow, its position is usurped by an unforeseen force.

3.2 The Industrial Age Management Framework Fails In The Unpredictability Of Network E-Economics

Current approaches to strategic management are based in the foundations of the industrial age, not unlike those developed by Alfred Sloan in the 1920s and 1930s²². As recently as 1991, Peter Drucker suggested that little has changed in management thinking.

No new theories on which a big business can be built have emerged ... but the old ones are no longer dependable²³.

Managers trained in business schools in the last half of the 20th century have received the conventional wisdom about the industrial age. This version of strategic management is coherent, but may be not be appropriate for an e-business operating under network e-economics.

3.21 The industrial age had a coherent framework of strategy, structure and governance

The industrial age framework for strategic management has three components:

The *strategy* is to become an efficient producer of products and/or services. From a base of experience, predict future demand in the mass market, plan the resources required, schedule production accordingly, build and deliver offers.

The *structure* is a chain of functional specialties, scheduled as a series of outputs. Standard processes are followed. Plan your work and work your plan. First make, then sell.

The *governance* system is command-and-control. The supervisor understands the "best way" to do things, and specifies those procedures for the worker to execute. The supervisor controls quality by inspecting results.

This approach worked well with a predictable future, and efficiency through economies of scale resulted in competitive advantage.

3.22 The unpredictability inherent in network e-economics has caused the industrial age framework to fail

The removal of the premise of predictability results in a loss of coherency for the industrial age management framework.

²¹ Arthur (1996), p. 104.

²² See Sloan (1964).

²³ Peter Drucker, Wall Street Journal, 1991.

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The *strategy* of efficiency is inappropriate, because demand -- the acceptance by customers of offers by the enterprise -- is uncertain. The reaction to reset the plan based on new information increases in frequency. Planning becomes ineffective when the reaction time for change takes longer than the window that the market allows.

The *structure* does not follow a linear chain or process, as the organization is extended through outsourcing agreements, alliances and/or networks, rather than integration. Customers demand custom responses through one-to-one interactions.

The *governance* system of command and control fails, because it is ineffective with knowledge work. Leaders can't be omniscient about everything that happens in the enterprise, and those closest to the work (and customer) know better. Since knowledge workers are highly intelligent, they apply their own judgement to procedures, and governance becomes "communicate-and-hope".

If only one component of the strategic management framework was failing, a repair might be in order. If the strategic management framework as a whole is failing, what should be done?

Brian Arthur suggests that a new approach to management is required.

Much of this "re-everything" predilection -- in the bulk-processing world -- is a fancy label for streamlining, computerizing, downsizing. However, in the increasing-returns world, especially in high tech, re-everything has become necessary because every time the quest changes the company needs to change. It needs to reinvent its purpose, its goals, its way of doing things. In short, it needs to adapt. And adaptation never stops. [... When] the games themselves are not even fully defined, you cannot optimize. What you can do is adapt. Adaptation, in the proactive sense, means watching for the next wave that is coming, figuring out what shape it will take, and positioning the company to take advantage of it. Adaptation is what drives increasing-returns businesses, not optimization.²⁴

Thus, the entire premise of strategic management needs to change.

3.3 The Sense-And-Respond Organization Is An Adaptive Approach To Strategy, Structure And Governance

In Adaptive Enterprise, Steve Haeckel proposes an alternative to the industrial age management framework. The sense-and-respond model prescribes:

The *strategy* is to be adaptive. Roles within the enterprise sense changes in environment, and create appropriate responses. A key to success is knowing sooner what customers will value, and then establishing the capabilities to be available to respond when a specific customer request is received.

The *structure* is a set of modular capabilities that can be deployed uniquely for each customer request. The capabilities established are based on the scope of customer

²⁴Arthur (1996), pp. 104-105.

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requests expected. The form of the organization for a specific request is driven from the customer, back into the enterprise.

The *governance* system entails the specification of an organizational context by the enterprise leadership, and the coordination of work products by empowered individuals in roles. The enterprise leadership is accountable for creating an unambiguous purpose for the organization, and bounds on acceptable individual behavior. Outcomes are negotiated by accountable individuals in customer-supplier pairs, cascading down to other roles with accountabilities for sub-outcomes.

Each of the elements in this framework may have merits for strategists still in enterprises that are primarily industrial age. The strategy to be adaptive may help to get over a one-time discontinuity, followed by a return to efficiency when predictability is restored. A structure of modular capabilities may increase the efficiency of resources used. A governance approach of organizational context and empowered coordination may be useful in any enterprise with knowledge workers. The value of the sense-and-respond approach is, however, as a coherent framework that responds to the unpredictabilities resulting from the combination of these three elements, in a way that traditional approaches to strategy can not.

4. AN E-BUSINESS DESIGNED FOR THE UNPREDICTABILITY FROM NETWORK E-ECONOMICS WOULD OPERATE ADAPTIVELY

How would a strategic management framework that meets the challenge of unpredictability from network e-economics differ from traditional strategic management?

An adaptive e-business would operate in the following manner:

1. It would adapt to customers one-to-one.
2. It would adapt its capabilities to respond to a wide range of customer values.
3. It would maintain coherent purpose and consistent behavior in adaptation.
4. It would adapt rapidly at large scale over a broad scope.

The value of each of these attributes for an adaptive e-business will be described, with a discussion about how it would be approached with a sense-and-respond organization.

4.1 The Adaptive E-Business Would Adapt To Customers One-To-One

Earlier sections in this article discussed innovation adoption, economic scope and value capture from the customer's perspective. Organizations often get caught up in "what is the right thing to do", and "how do we do thing right". Designing an e-business from the customer's perspective provides an external arbiter of value.²⁵

²⁵ A system that is designed from the inside has issues with self-reference. How do we know the system, as a whole is operating properly? If the observer is not completely outside the system, he or she can not have an objective view.

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4.11 The sense-and-respond organization has dispatching and primary contracting roles to create structures of responses

To produce a deliverable for a specific customer, a representative of the enterprise with a direct customer relationship -- as a primary contractor, or possibly a dispatcher -- takes accountability for designing the response. Through the dialogue between that representative and the individual customer, an understanding of what is needed is created.

4.12 The sense-and-respond organization draws on capability modules required for the specific customer request

Products and services are not mass produced, in a make-and-sell fashion. They are assembled upon the customer request, from capability modules defined as available resources. Although these modules may be reused, they can be assembled in a different way for each individual customer.

4.2 The Adaptive E-Business Would Adapt Its Capabilities To Respond To A Range Of Customer Values

In order to readily respond to customer requests, a range of capabilities must have been established in advance. In the e-business world, this investment ranges from a commitment to acquire hard-to-get resources, to an option to provide a commodity at a prearranged quality and price. Instead of the overhead associated with preparing for every combination of product features predicted, the investment is made in understanding the ranges of attributes that customers really value.

4.21 The sense-and-respond organization establishes a breadth of capabilities over a range of customer value attributes

A product or service can be seen as a bundle of attributes, each attribute providing some level of function to the customer. Instead of preparing for the single "optimal" combination of attributes predicted to satisfy a segment of consumers, a range of feasible combinations of attributes can be discussed with each individual customer. This requires understanding the bundle from a number of perspectives: (a) the customer value as a whole; (b) the attributes, from the customer's perspective, that make it up; (c) the attributes, from the enterprise response perspective, on the functions that it can control; and (d) the product-service attributes that can be quantified and produced concretely. The most stable attributes are those closest to the customer. Capabilities defined more in terms of the customer's perspective, and less as product-service attributes, are likely to have a broader latitude.

4.3 The Adaptive E-Business Would Maintain Coherent Purpose And Consistent Behavior In Adaptation

Sometimes, an organization is described as "lost", or that it "doesn't know what it wants to be". These are issues of coherency of purpose. In addition, complaints are often heard about interactions with organizations that are dreadful on one day, and delightful on the next. These are issues of consistency in behavior. In the stability enjoyed in the industrial age, purpose was made coherent by constant reinforcement of a single mission

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or vision, and behavior was made consistent through the refinement of procedures. As the frequency of adaptation increases, following yesterday's goals or best practices may not be appropriate today.

4.31 The sense-and-respond organization requires the unambiguous declaration by the enterprise leader of organizational purpose and bounds on acceptable behavior

As a social system, an enterprise features decision-making both at the individual level, and at the level of the enterprise as a whole.²⁶ To reconcile these, individuals must understand their contribution towards the organizational purpose, called a reason-for-being. This declares what the enterprise exists to do, rather than what it does to exist. They must also understand bounds on acceptable behavior, called governing principles, which are expressed as "always" and "never" statements. With these definitions of purpose and bounds, individuals are empowered in roles to make decisions on behalf of the organization. Additional rules of thumb or best practices, called guiding principles, may provide additional direction.

4.32 The sense-and-respond organization defines most roles in terms of the outcome they produce

The enterprise leader creates a structure of accountable roles called the high-level business design. This design specifies the outcomes each role must produce for other roles in order for the system to produce its reason-for-being. The leader negotiates with executives to fill these roles, and empowers them to design their own subsystem of roles. Additional roles emerge in the operation of the enterprise, and may either become eventually formalized, or remain ad hoc.

4.33 The sense-and-respond organization adapts most rapidly as renegotiations between empowered individuals in roles

In the industrial age management framework, most contingencies could be foreseen and negotiated in advanced. In the unpredictability of network e-economics, unforeseen circumstances become commonplace. As a result, following through with a prior commitment may no longer produce value, or make sense. By adapting as quickly as possible, resources can be released towards more productive uses. Renegotiation therefore needs to be expected as an everyday occurrence, that can be initiated by either party to a commitment, without invoking a hierarchy of authority. Since renegotiations may have systemic effects, impacts on related upstream and downstream commitments need to be immediately informed.

Commitments negotiated to produce deliverables should change more rapidly than the structure of roles, which change more rapidly than governing principles, which change more rapidly than the reason-for-being.²⁷

²⁶ Social systems are differentiated from mechanical, organismic and ecological systems in Ackoff & Gharajedaghi (1996).

²⁷ Rates of change in "shearing layers" are discussed in great detail in Ing & Simmonds (1999), based on Brand (1994).

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4.4 The Adaptive E-Business Would Adapt Rapidly At Large Scale Over A Broad Scope

Small organizations adapt naturally, as the number of social relationships are relatively small. In contrast, large enterprises face the challenges of inertia, as a large number of people, often distributed geographically, coordinate their adaptation. One solution is enablement through electronic communications, allowing rapid connection between individuals in the organization, and with any customer that they touch. These supporting information systems are not for bookkeeping or records, but are interactive, managerial information systems that assist in adaptation and coordination.

4.41 The sense-and-respond organization enables individuals through Role-Specific Adaptive Loop Support

Every person adapts through a four stage loop of sense, interpret, decide and act.²⁸ In the sense-and-respond organization, adaptive loops are considered to be specific to roles, that are accountable to producing an outcome. Individuals play multiple roles, and a single role may be filled by a number of individuals. The definition of roles is important across the enterprise, as it allows sharing of knowledge across a community.

A "heads-up display" is a user interface that can be configured to provide an individual with an electronic view of the environment for the roles that that person plays in the enterprise. As an alternative to viewing and manipulating the physical world directly, the role-specific adaptive loop support intermediates the world through software.

4.42 The sense-and-respond organization provides social and technological enablement for conversations and registration of accountabilities through Empowered Coordination Support

Unpredictability presents difficulties for business process designers. To deal with ad hoc responses, Allan Scherr decomposes business processes into two parts: accountability and procedure.²⁹ The procedure that an accountable individual follows can change from customer to customer, and even midstream during production of an outcome. A real-time method is needed to keep to track of "who owes what to whom".³⁰

The design and execution of business processes in response to individual customer requests is based on empowerment. The technological enablement of coordination requires two functions: (1) the registration of the state of negotiations or commitments so that a status can be looked up at any point in time; and (2) explicit -- most likely as written -- communication between a customer role and supplier role, possibly asynchronously (as a form of e-mail). Social enablement of coordination requires (1) a basic level of skill in negotiating outcomes, as conditions are worked out, rather than dictated; (2) authenticity in conversations -- saying what I mean, meaning what I say, and

²⁸The adaptive loop was introduced in Haeckel & Nolan (1993), and in greater detail in Haeckel (1999), Chapter 5.

²⁹Scherr (1993) describes business processes with two dimensions: accountability and procedure.

³⁰This is described as the commitment management protocol in Haeckel (1999), Appendix C.

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knowing what I mean -- so that trust is generated; and (3) recognition of early renegotiation, with enforcement of consequences for failed commitments.

4.43 The sense-and-respond organization provides social and technological enablement for the design of complex systems of outcomes through Collaborative Decision Support

If it were possible to conduct all coordination as two-person pairs of commitments, empowered coordination support would be sufficient. However, for the more significant designs in the enterprise, the simultaneous involvement of a large number of people with a wide diversity of perspectives not only improves the prospects for success in implementation, but also the potential for selection of a better alternative, as more points of view are included.

The quality of collaborative decisions is derived from the base of organizational knowledge that represents the intersection set of the knowledge of all of the people involved, rather than the union of their knowledge.³¹ Through an inquiring systems approach, new knowledge can be brought into collaborative decisions.³² Most of the knowledge created in the collaboration occurs in the social process, in people's heads, as they debate and refine their understanding of the issues from multiple perspectives. In this case, the technological enablement of collaborative decisions is only partial: when an individual makes knowledge explicit by codifying it into a database, it falls from the level of knowledge to information, at best. Records of the debates, and or alternative views, provide more context as a history of decisions, rather than only the one path chosen.

4.44 The sense-and-respond organization uses these learning support subsystems to "manage by wire" and adapt at information speed, rather than physical speed

Responding appropriately to unpredictability requires that the response cycle be in sync with the rate of change in the environment. The three learning support subsystems described above work in combination: dialogues produce the larger context, in which individuals negotiate personal accountabilities for producing an outcome, and views of the external world continually inform the need for individuals to adapt.

5. E-BUSINESS STRATEGY NEEDS A MAJOR CHANGE IN THINKING ABOUT STRATEGIC MANAGEMENT

Based on the preceding discussion, what needs to be done?

The concept of strategic management has evolved over the last five decades of the 20th century. What is proposed is perhaps as large as the shift from the agricultural age to the industrial age. The phenomenon of network e-economics is not going away, and is the environment for any e-business, at the ground zero of the impact.

This article concludes with two ideas:

³¹Kusnic & Owen (1992) first developed this as the Unifying Value Process, which was then elaborated in Baraabba (1995) and then Kusnic & Owen (1999).

³²Mitroff & Linstone (1993) describe "five ways of knowing", building on the work of Churchman (1971).

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What major changes in mental models about strategic management need to change?

What are the failure modes if these mental models don't change?

5.1 An E-Business Need To Be Conceived As Open, Adaptive, Purposeful, Social System

There are a number of strategic management approaches based on systems thinking.³³ However, the pandemic of unpredictability spawned by network e-economics requires special consideration. For e-business, the design of the enterprise as an adaptive, open, social system requires some major shifts in mental models. These include:

a break from strategy as process design to system design;

conception of the enterprise as an open, dynamically changing system of multiple organizational subsystems, both within and beyond corporate boundaries.

These are discussed in more detail, below.

5.11 Strategy as system design considers function, structure and process

Business process re-engineering focused on the specification of process. System design requires consideration of function, in addition. Jamshid Gharajedaghi provides a useful definition of these concepts.

Structure defines components and their relationships, which in this context is synonymous with input, means, and cause. *Function* defines the outcome, or results produced, which is also synonymous with outputs, ends, and effect. *Process* explicitly defined the sequence of activities and the know-how required to produce the outcomes. Structure, function, and process, along with their containing environment, form the *interdependent* set of variables that define the whole.³⁴

Systems thinking is demonstrated in Brian Quinn's distinction between three levels of professional knowledge: (1) cognitive knowledge (or know what), (2) advanced skills (know how), and (3) systems understanding (know why).³⁵ This raises the question as to "what is strategy"? To be complete, strategy must not only include *what* (as structure) and *how* (as process), but also *why* (as function).

³³Ackoff (1994) describes the circular organization in an approach to the enterprise as a system that does adapt, but does not assume that rapid, discontinuous change is the norm. Senge (1994) is based in cybernetics, but doesn't have the emphasis on purposefulness of the enterprise as a whole. The Search Conference, described in Emery (1997) and Emery & Emery (1997) emphasizes the development of alternatives through a series of community meetings, but does not necessarily empower the individuals, after the design is implemented.

³⁴This definition, from Gharajedaghi (1999), p. 110, is a refinement of the Ackoff & Emery (1972), in which the distinction is made between the "function of outcome" and "structure of action" in non-purposeful, purposive and purposeful systems. Ackoff & Emery (1972) don't categorize process as distinct from structure: process is seen as an arrangement in time, whereas structure (as viewed by Gharajedaghi) is only regarded as an arrangement in space.

³⁵This categorization appears in Quinn, Baruch, and Zien (1997) p.3, and is applied specifically in discussion of the management of professional intellect.

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Russell Ackoff relates the consequences of design starting not from the whole, but from parts.

[... Of] the approximately 555 different model of automobiles available ... Which one of the cars has the best engine? [... the best transmission?] We ... continue until we know ... "the best possible automobile". After all, it will consist of all the best parts available. The fact is that we will not even get an automobile, let alone the best one, because *the parts do not fit together. The performance of a system is not in the sum of the performance of its parts taken separately, but the product of their interactions.*³⁶

Why is the strategy to design an adaptive system appropriate? It is the only approach appropriate for an environment of rapid, unpredictable change. Since design of the system occurs at multiple levels within the organization, *why* must be considered as well as *what* and *how*.

5.12 The value-producing e-business adapts as an open enterprise composed of multiple organizations

The important first question for any system designer is: What is the system to be designed?

In the world of network e-economics, the system is typically not a single, integrated enterprise, but a collection of organizations, each contributing towards producing deliverables for customers. How do the alliance partners work with each other? Who leads, and who follows?

The system to be designed is, by definition, an open system to give and receive things from other systems in its environment. The organization may not be, however, the complete *value-producing system*. It may be the organization in direct contact with the customer. It may be the organization that provides a critical technology. It may be the organization that provides managerial or technical skills for innovation.

In the definition of an open system, there is always a larger containing system, and there are always subsystems. Design of a system requires optimization at one level, and therefore sub-optimization at others.

The sense-and-respond management framework of strategy, structure and governance applies at whatever level the system is defined.

5.2 The E-Business That Does Not Adopt A New Strategic Management Framework Will Fail To Systematically Adapt

What are the failure modes if these mental models about strategic management don't change? This article began with a discussion of three challenges to e-business. Let's revisit them, and review the impact of strategy as the design of an adaptive enterprise.

³⁶Ackoff (1994), p. 23.

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5.21 Without an ability to systematically adapt both to changing customer value profiles and changing potential capabilities, the viability of the enterprise is endangered

Most of the value of a business is not in the profits that it creates in the short term, but in the sustainability of a long-term stream of cash flows it generates.³⁷ Sustainability requires that the e-business enterprise adapts both to changes in its customers, and other players in the market. The nature of the network e-economy ensures that transaction costs will continue to fall, and the structure of the industry will be a fluid stream of complementors and competitors.

5.22 Without a method to systematically adapt to the appropriate scale and scope, the enterprise may not reach or sustain critical mass

In order for an e-business to reach a significant scale and scope, it must proactively *anticipate* implicit customer values and *pre-empt* competitors by organizing capabilities into a system to respond to current customer requests while others are still planning for future predicted requests³⁸.

The temptation to *predict* customer demand, and establish an efficient *make-and-sell* infrastructure should be resisted. Since unpredictability makes adaptiveness more important than efficiency, the design of the capabilities must be modularized, for assembly in the specific configuration needed by each customer.

5.23 Without a method to systematically adapt with innovations, the enterprise will become irrelevant

Disruptive innovation means discontinuous change. The challenge with network e-economics is that change is rapid, and the growth of e-business guarantees that customers will have more and more alternatives from which to choose. An e-business that loses its customer base could be out of business almost overnight.

5.24 Where do we start?

E-business may be unpredictable, but it's not random. The first question to be asked should be: what strategic management framework is appropriate for e-business?

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³⁷The Shareholder Value approach described in Rappaport (1986) bases the market value (i.e. stock price) of a company on its expected future stream of cash flows. When the value of discounted cash flows are calculated, it can be shown that more than half of the expected value for the firm is developed in the period beyond five (and sometimes as long as ten) years from the present.

³⁸Slywotsky (1999) describes *anticipate and pre-empt* is a proactive approach to sense-and-respond. A more passive approach would be *listen and comply*, where the current explicit customer requests are pursued, rather than implicit customer requests.

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