

e-Business Management Models: A Services Perspective and Case Studies

Todd Miller, Matthew L. Nelson, Stella Ying Shen and Michael J. Shaw

President and COO, The Revere Group
1751 Lake Cook Road, Suit 600
Deerfield, IL 60015
tmiller@reveregroup.com

Department of Business Administration, University of Illinois at Urbana-Champaign,
Urbana, IL 61801
mlnelson1@uiuc.edu

Department of Business Administration, University of Illinois at Urbana-Champaign,
Urbana, IL, USA
yingshen@uiuc.edu

Department of Business Administration, and Beckman Institute for Advanced Science and
Technology, University of Illinois at Urbana-Champaign,
Urbana, IL, USA
m-shaw2@uiuc.edu

I. INTRODUCTION

Managing an organization's e-business adoption strategy has proven to be a daunting task. Strategic decisions with far-reaching implications must be made on a timely basis. The collapse of NASDAQ's high-tech (dot-com) stocks during 2000 / 2001 offers painful proof of the extraordinary challenges associated with managing e-business. Gone are the days of evaluating new venture start-ups based on burn rates, over-inflated revenue estimates and the vita of a silicon-valley cowboy. Indeed, the "irrational exuberance" in dot-com company stock market valuations (warned by Federal Reserve Chairman Alan Greenspan) has come to fruition. The market has forced companies to focus, once again, on the basics: cost, quality and profitability. Lock-step with this *back-to-the-basics* pendulum swing, is the utilization of a business model that is long-term focused, profit-based, and includes the unique challenges (and opportunities) with conducting commerce via the Internet. That is, this business model should enable the cost, quality and profitability basic necessities, utilizing a long-term profit-based business plan, while simultaneously accommodating the unique business issues associated with e-commerce. This chapter refers to such models as e-business management models.

The purpose of this chapter is to identify key e-commerce business drivers and to document e-business management models utilized in industry. One particular e-business management model will be explored in great detail. Entitled the *Technology Solution Lifecycle*, this e-business management model was developed by *The Revere Group* based out of Deerfield, IL. This chapter will describe each stage of the *Technology Solution Lifecycle* and present four case studies illustrating actual organizations that have adopted an e-business strategy utilizing this model.

This chapter will also explore other e-business management models, at a higher level, from the EDS and IBM corporations. In addition, the emerging business models, based on recent trends of e-commerce companies, will be presented and discussed. Comparisons will be made between all of these e-business models, with an emphasis toward highlighting the common (key) ingredients among each.

The chapter is organized as follows. *Part II* will provide an overview and background information on *The Revere Group*. *Part III* will identify key business drivers leading toward the growth in e-business. *Parts IV* and *V* will document the stages in the *Technology Solution Lifecycle* management model and present the four case studies, respectively. *Part VI* will discuss other e-business management models from industry and highlight the common (key) ingredients among each.

II. THE REVERE GROUP

The professional-services industry revenue is projected to grow by 18% in 2001 to \$138 billion. The environment that pushed for e-business projects has changed. Twelve to eighteen months ago the emphasis was on creative web-sites. Currently, however, as of the beginning of 2001 the emphasis has shifted back to basics (cost savings, reduced market lead times, and increased quality). Several reasons account for these changes including NASDAQ's high-tech (dot-com) collapse and fears of recession. Companies are now seeking business skills from the

professional-services industry, and not just Internet expertise. It's expected that 1 in 4 professional service firms will survive.

Founded in 1992, The Revere Group is a business and technology consultancy focused on helping mid-tier companies maximize return on their technology investment through the design, implementation, and management of e-business and enterprise solutions. The Revere Group is headquartered near Chicago in Deerfield, Illinois, and also has offices in Boston, Charlotte, Chicago, Cleveland, Denver, and Milwaukee. It employs more than 425 people.

"We're seeing a return to the basics. No longer can new business or technology initiatives be pursued based on a hot business model. They must be grounded in reality, with a clear path towards achieving the critical dimensions of competitive advantage: Time, Cost and Quality. At The Revere Group, strong, experienced teams help clients realize results in these areas by providing real answers to their complex business and technology challenges."

Todd R. Miller, President, The Revere Group.

Any astute business person will tell you that success is not about having a killer business plan, but effectively implementing one. In the recent past, many companies, dot-coms and brick and mortars alike, found themselves led down the primrose path of the New Economy only to find that a cool web site and an ad on the Superbowl does not an e-business make. Rather, there are some very real operational and technological hurdles that companies face as they attempt to achieve their strategic vision. The Revere Group helps mid-market and larger companies achieve market leadership by addressing critical operational and technological challenges. The Revere Group provides a broad base of technology and business consulting, specifically around their client's buy-side, sell-side and enterprise operations.

III. KEY BUSINESS DRIVERS

Despite the shake-out of dot-com companies during 2000, the key business drivers leading organizations to adopt Internet-based solutions remain.

Supply-Chain Management

A supply-chain is an avenue where inter-organizational flows of material and information, as well as financial transactions take place. It is called a "chain" because traditionally all the flows were linear, starting from the suppliers, to manufacturers, distributors and the final consumers. The focus of chain partners was managing material flow – how to complete the process from inputs to products and deliver to customers smoothly. Therefore, supply-chain management was very often equivalent to logistics management, mainly dealing with materials replenishment, warehousing and shipping.

As the Internet is serving as a superior communication channel, the old chainlike buyer-supplier relationship has been changed into a supply network where suppliers, manufacturers, intermediaries and customers are all connected and are able to interact with others directly (see Figure 1). On this view, the new supply-chain management will shift its focus from old material flow management to a combined flow of material, information and financials. The supply network is a critical component of any e-business strategy, such as build-to-order, driving enterprises toward e-business.

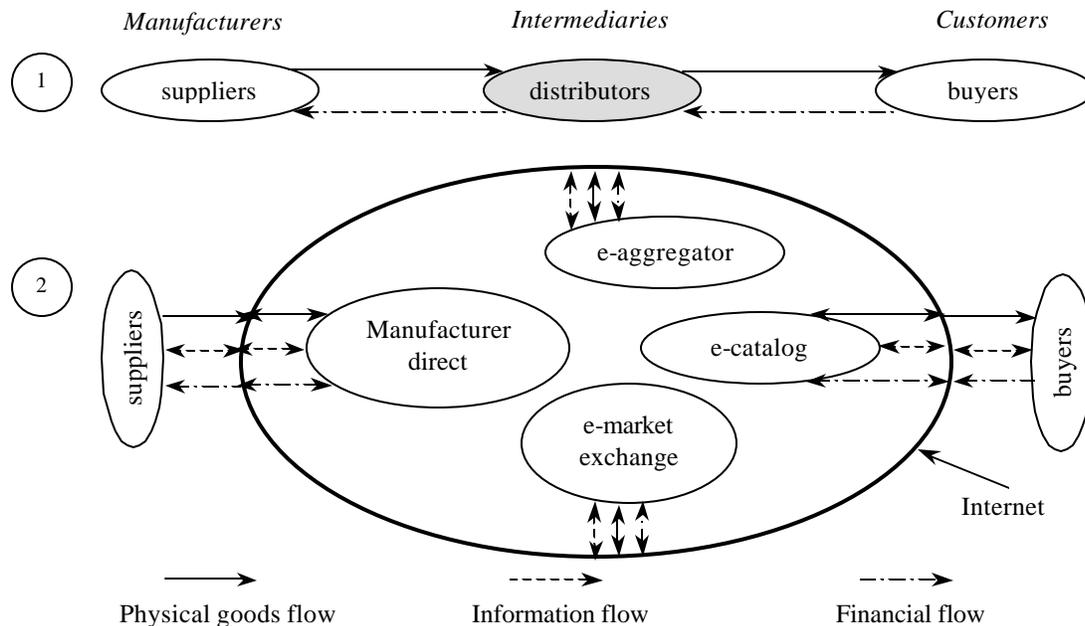


Figure 1. Traditional vs. Web-based Supplier – Buyer Interactions

This new supply-chain management is aimed to achieve two objectives: (1) seamless coordination among chain partners and (2) real-time collaboration.

Information sharing has always been the key to coordination. With the advancement of communication technologies, such as intranet, extranet, electronic data interchange (EDI), and virtual private network (VPN), companies have already started to coordinate their purchasing, production, and distribution activities to reduce cycle times and cut operational costs. Vendor-Managed-Inventory (VMI) and Just-In-Time (JIT) are two typical examples. Although there are many successful industry stories, such kind of coordination was usually initiated by and limited to large corporations who have a significant power over their downstream or upstream partners. The Big-Three automakers achieved substantial savings in direct purchasing by ordering their major suppliers to do business via EDI. Likewise, P&G greatly improved its channel efficiency through EDI-enabled continuous replenishment (CRP).

Internet-based supply-chain management creates an even wider avenue for coordination. With very little cost as compared to EDI, all supply-chain participants can receive and exchange information on purchasing, production, and shipping at real-time. Ultimately, the old static supply-chain with production forecasting and planning on retrospective data will be replaced with a responsive supply-chain: the manufacturer “knows” what the end customer wants at the time he/she orders; the same information also goes to the suppliers who immediately arrange the necessary materials and parts for the manufacturer. Then the manufacturer makes the product and fulfills the order in no time since the carrier has the shipping information and has arranged proper delivery of the product. Thus efficiency is achieved as a result of supply-chain coordination, and is reflected in the reduced inventory as well as shortened cycle times at every level.

Real-time collaboration is the most important and unique feature of Internet-based supply-chain management. Because the Internet is ubiquitous and “always on”, it allows people at different geographic locations to work on the same project collaboratively to speed up the project progress and improve resource utilization. This collaboration can be even more enhanced with advanced technologies such as Internet video conferencing and 3-D imaging. The biggest automotive industry-wide exchange (Covisint) has already planned to conduct collaborative product design through this on-line exchange.

Web-Enabled Mission Critical Applications

The criticality of an application to an organization depends on that organization’s line of business. For example, reservation systems are mission critical to airline organizations. Production control and logistics applications are mission critical to manufacturing organizations. Inventory and purchasing applications are mission critical to retailing and distributing organizations.

The development of web-enabled applications offers no exception to the criticality of key applications to an organization. The emergence of new Internet-based businesses spanning every industry offers excellent examples. Web-enabled consumer grocery selection and purchasing systems are mission critical to Internet-based home-delivery organizations. Auctioning systems and electronic catalog applications are mission critical to Internet-based vertical community service providers. Stock trading and security applications are mission critical to on-line trading organizations.

Internet-Enabled Workflow

The workflow from one company or one department to another used to be a black box, the downstream had to “guess” and wait for it passively. This picture is being changed as a result of Internet communications. Imagine that the company gets an automatic e-mail notification of receipt once it has placed an order with the supplier, a notification of shipping when the products are shipped, and another notification of receiving when the goods arrive at the company’s dock. During the course, the company can check the status of the order or even request for acceleration so that they can schedule production accordingly. This transparent workflow allows e-business process redesign to achieve better resource scheduling and planning.

Integration of Customer-Facing Front-End with Enterprise-Wide Back-End Applications

The four primary value chain activities (inbound logistics, operations, outbound logistics, and service) defined by Porter involve the interactions among three parties: the suppliers, the manufacturers, and the customers. It is safe to say that although the pattern of interaction has been changed in doing e-business, the value creation activities and the direction of the flow stay the same.

Since the ultimate goal of enterprises is to create value to shareholders through selling goods and services, any customer-facing front-end systems should work to make it easy for customers to select, purchase, and be serviced. Therefore, most companies have been putting a lot of effort into improving the user-friendliness and functionality of their front-end systems to enhance the richness of communication and create better customer experience of e-commerce. In addition, unlike traditional channels that are usually built on proprietary networks, those applications are

based on Internet technologies, ensuring the reach of product offerings. Two examples are the Customer Relationship Management (CRM) application from Siebel, and order management application from Art Technology Group.

Nevertheless, the value to the customer cannot be delivered without back-end operations. Enterprises have been implementing enterprise resource planning (ERP) systems to integrate and optimize their internal operations, such as production, Engineering, financial controlling and human resources. Increasingly, those enterprise systems are integrating web connections to leverage the speed and ubiquitous nature of the Internet. For example, SAP's R/3 system is Internet compatible and can be combined with other types of software under the enterprise umbrella. Moreover, application packages from PeopleSoft, JD Edwards and others are able to serve specific functional needs, such as human resource management.

At the other end of the value chain, as discussed earlier, there are also many applications, web-based or non-web-based, that companies use to increase their procurement efficiency and manage the collaboration and coordination with their suppliers. The enterprise procurement packages from Ariba and CommerceOne and the supply-chain management application from i2 Technologies are the well-known examples in this category.

However, e-business becomes possible only after all those bits and bytes are put together. Companies like Oracle have developed applications that integrate the customer-facing front-end with enterprise-wide back-end applications, creating an e-Enterprise that stretches its virtual boundary both forward and backward to interact with its customers and suppliers directly via e-commerce activities (see Figure 2).

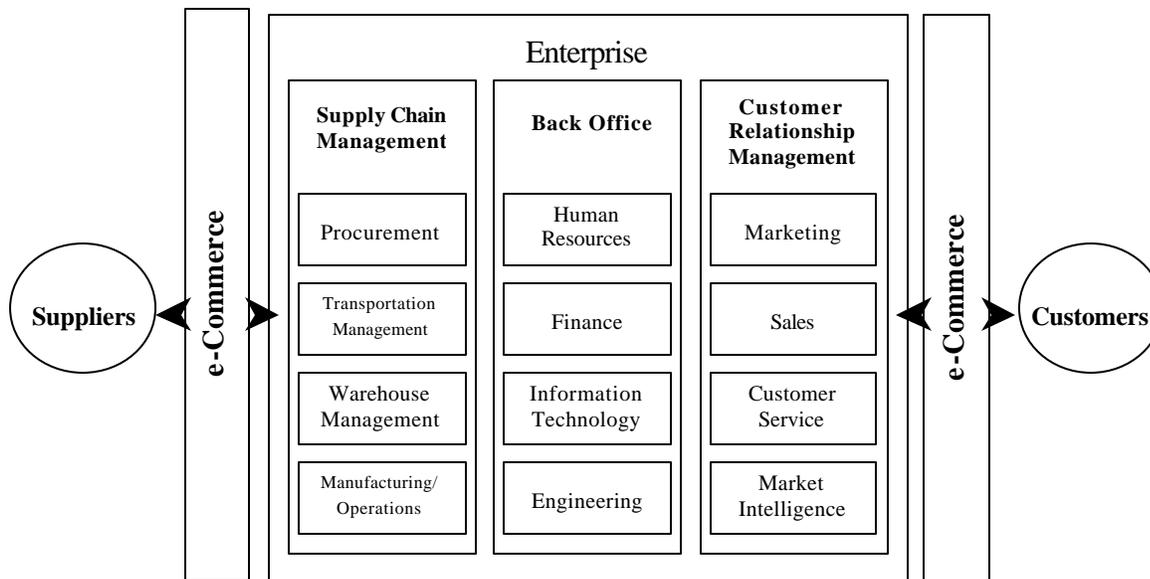


Figure 2. Extended Enterprise

The Market Evolution and Complexity of e-Commerce / e-Business Development

Looking retrospectively, we can see that today's e-business is very different from the e-commerce that we talked about just a couple of years ago. E-Commerce / e-Business is creating tremendous impact on our economy and its subsequent economic rules. The volume of e-

commerce as a percentage of the nation's GDP is increasing at an increasing rate. The nature of e-commerce / e-business is getting more and more complex as the market evolves (see Figure 3).

The first generation – e-Commerce emerged as companies rushed to set up their homepages to claim their web appearances. All sorts of dot-coms, fueled by enormous venture investments, appeared in many business sectors by simply setting up a web server and a database. The number of web sites selling goods and services directly to consumers mushroomed. However, most of these dot-coms were started under such hype that their revenue projections were too aggressive to realize. Not surprisingly, a stock market slump hit the dot-com world extensively in early spring 2000 after these companies continuously failed to deliver business profit.

It was the crash of the dot-coms that has lead us to rethink the value of e-commerce / e-business and how we can achieve it. This is where the second generation of e-business comes into place. Second generation e-business is characterized by the emergence of “mission critical, industrial strength platforms” that support new markets and new models. It is now widely understood that a successful e-business is built on a business model with a valid value proposition, a clearly defined e-business strategy, and an integrated information technology (IT) infrastructure that facilitates the strategy. The venue of conducting e-business has also been greatly expanded, especially with the growth of business-to-business (B2B) e-commerce. From implementing individual web-based applications to transforming traditional businesses into click-and-mortar, enterprises are continuously exploring new opportunities and new markets for e-business.

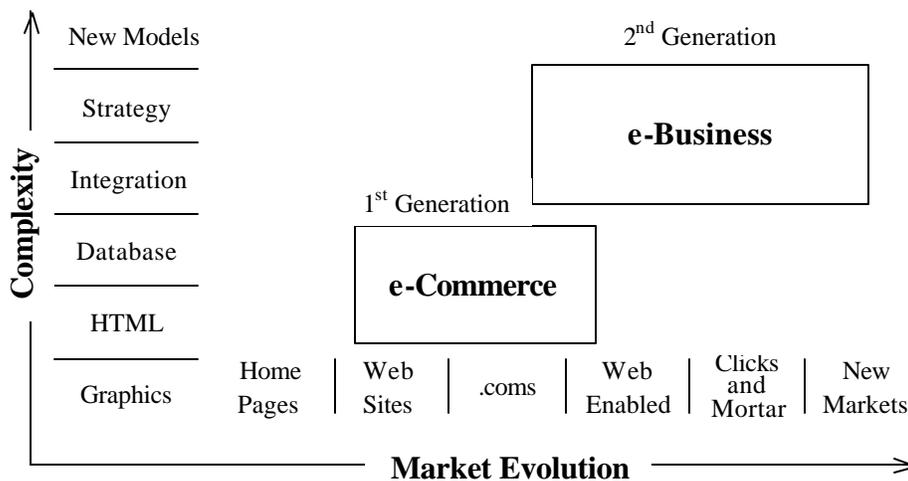


Figure 3. The Market Evolution and Complexity of e-Commerce / e-Business Development

IV. TECHNOLOGY SOLUTION LIFECYCLE

The Technology Solution Lifecycle was developed by the Revere Group. The Technology Solution Lifecycle is an e-business management model that can enable organizations to leverage the vast opportunities available through the Internet channel and to systematically integrate e-business into an organization's core competencies. The lifecycle is a six-step iterative process that begins with developing a technology Strategy and concludes with measuring the financial and operational performance of the strategy in the Analyze stage. See the appendix for an overview diagram of the Technology Solution Lifecycle. If the returns are unsatisfactory, an organization must *exit* or *adjust* their strategy, which initiates the lifecycle process again. The following are descriptions for each of the six-steps included in the Technology Solution Lifecycle. Section VI includes four case studies as illustrations of applying the Technology Solution Lifecycle.

Strategy

Perhaps an organization's strategy is *pure e*. That is, the organization is an Internet-based company with a supply chain and distribution channel that is solely based through the Internet. Examples of such organizations include on-line stock trading, Internet service providers (ISP), Internet search engines, or MP3 music providers. Alternatively, however, for most organizations that have been in existence for a while (say longer than 4 or 5 years) they are seeking to develop a technology strategy. That is, they're seeking to embrace the Internet and rapidly leverage all of its opportunities into their existing and future business models.

The Technology Solution Lifecycle approach begins with Strategy, which uses an organization's target market segments as a jumping off point for defining the technology strategy. For each target market segment, initiatives are identified that will drive internal efficiency or revenue growth. The Strategy phase begins with Visioning Workshops, which captures the executive vision and draw out a set of solution possibilities, goals and/or "wish lists." These ideas serve to guide the team through the entire strategy proceedings.

The Revere Group's comprehensive e-business diagnostic methodology is called e-Pointsm. This methodology provides a thorough view of potential e-business initiatives within an organization and the impact each initiative can have on a business. The goal of e-Pointsm is to identify the intersection of target market segments, internal functions and processes, and best applied technologies. The convergence of these three variables represents possible opportunities or "e-Point" solutions. This unique approach to identifying e-business initiatives ensures that organizations will not miss an opportunity. The e-Pointsm methodology is summarized in figure 5. The example outlines Revere Group's approach to applying e-Pointsm to Supply Chain functions.

The Revere Group's e-Pointsm framework offers a comprehensive view of how an organization can begin to assess, structure, and plan for the new e-based technologies. With supply chain management (SCM) functions along the vertical axis, market segments along the horizontal axis and x-net capabilities along the third axis (outward), the model enables an organization to triangulate (e-Point) toward a strategy. For example, targeting an e-Point in the upper right quadrant of the graph would indicate an organization's strategy is impacting all of their SCM

functions across all of their market segments. Expanding this targeted strategy outward along the third axis indicates an organization is planning to apply this strategy to their internal intranet, the external Internet, and outward to their value-added SCM-based extranets. Similar graphs could be developed for an organization's other targeted strategy areas (distribution channel management, customer relationship management, product support management, etc.).

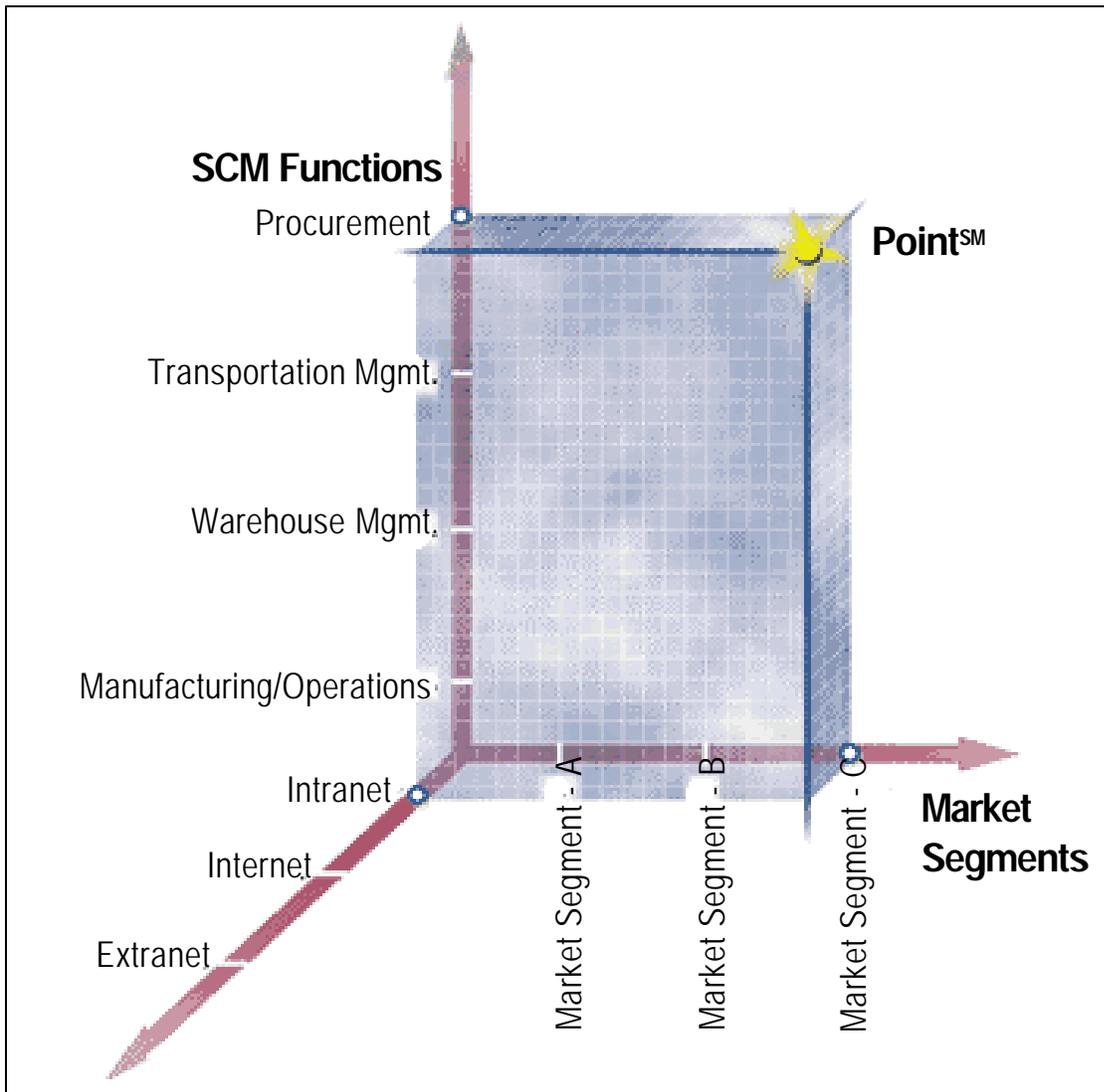


Figure 5. e The Revere Groups e-PointSM

e-PointSM has been deployed by The Revere Group for clients in the insurance, manufacturing, banking, .com, services, consumer products, distribution, non-for-profit and other industries, resulting in business solutions that generate bottom line benefits to the company.

For engagements requiring expedited solutions delivery, The Revere Group brings to bear its recently launched accelerator, the r-Factory. The r-Factory provides a hi-tech, off-site

development environment designed to foster innovation and creativity. Here the company assembles multi-disciplinary teams of clients and consultants, meshing the strategy, e-marketing, technology and process components to speed progress from concept to reality.

Marketing

The next step along the Technology Solution Lifecycle is Marketing. Regardless of the selected strategy chosen, all organizations must initiate their lifecycle with some form of presence on the Internet. At a minimum, this could begin with a simple web-page announcing the five W's (*who, what, why, where, and when*) about an organization. In fact, by 1998 / 1999 most organizations had upgraded these basic 'introductory' web-sites to include creative web-page designs and offer basic content services (on-line user manuals, product support, FAQ, etc.).

Working under the basic premise that a click on a web-page is *significantly cheaper* than a phone call to a product support help-desk, this is where the decisions become more challenging. At this point, organizations must begin to design a *content strategy* for their web-site. Will the web-site content be more customer relationship focused (on-line sales order tracking, customer purchase history, customer specific web-pages) or will the content be more supply chain focused (e-procurement, electronic cataloging, shipping status tracking)? The opportunities seem endless.

The key issues on e-marketing are succinctly captured in the following excerpt from the company's white paper, "The Good News About e-Marketing".

"Hi, Dave, welcome back. How's the cordless driver you purchased during your last visit? Did you know we are having a sale this week on drill kits for that 1/2-inch T-handle driver? And if you purchase a kit today, we'll include a 12-volt industrial work light that clips onto your Cosco workbench for free. So tell me, what do you need today?"

An awfully personal salesman, isn't it? In fact, he treats every customer who stops by just like this. All 15,234 of them. And best of all, he works 24-hours a day, seven days a week. He'll even go to customers' homes to inform them of special offers or answer questions. Seem impossible? No, because this salesman is a web site. And, believe it or not, customers will expect this type of treatment within the next two to three years.

It's true. The Internet is changing the rules of sales and marketing. Drastically. And it's not just for "dot-com" companies. Even companies selling business-to-business will have to adapt to the new ways of marketing.

These changes, like all changes, pose threats as well as opportunities. Business could be lost in a click-literally. Or customer loyalty could be cemented for a lifetime. Organizations agile enough to adapt will be positioned for successful growth in the future. Those that don't will likely struggle.

- *First, re-prioritize your marketing efforts. In place of traditional one-way communications, think of continuous communications that focus on building customer relationships on a one-to-one level.*
- *Second, always gather information. During a customer's or prospect's first visit to the web site, the relationship is established and the company begins to understand the visitor's preferences.*
- *Third, use traditional forms of marketing to drive customers to your web site and filter them into the Communication Continuum*
- *Fourth, choose a single-source provider. In this new business environment, a company's web site is becoming the single most critical component of the marketing strategy in terms of building and maintaining the brand.*

Although the landscape has changed in the e-world, the philosophy of branding has not. Branding remains a strategic marketing function that requires a well thought out game plan. A successful brand is built with long lasting impressions - not a fleeting message based on a series of shotgun marketing campaigns. Launching a web site or participating in a web exchange does not guarantee a brand's success. Active steps must be taken to continually build brand equity with all of an organization's constituents on a personalized basis.

The focus of the Marketing stage is to create on-line branding and drive traffic to the site—in effect leveraging the power of the Internet to the company's best advantage. There are four key planning and design activities for an effective marketing strategy:

Marketing Strategy

The Revere Group's philosophy about marketing strategy mirrors the philosophy about strategy in general -- it should complement the enterprise's overall business strategy. On the sell-side, the Internet is simply another vehicle for an organization's sales and marketing activities. The Revere Group incorporates brand and identity definition, sales and distribution channel optimization, and media planning activities into a comprehensive strategy designed to lead the maximum number of visitors to a web-site.

Branding Strategy

Consideration must be given to two different facets of online branding: extend an existing brand, or create a new one over the Internet channel. Experienced professionals can assist an organization in leveraging this new medium to its best advantage, whether that is establishing how to extend an existing brand or defining the development of a new brand.

Media Planning

New technology always brings with it new media placement considerations. An organization must recognize the need to evaluate all available media outlets as vehicles for delivering a message to the marketplace. The Revere Group can guide media planning activities with vast experience that uniquely positions them to be a qualified partner in weighing the pros and cons of various Internet medium placement options.

Multiple Media Creative Design

The new Internet medium presents new challenges not only for media placement, but also for creative design. Designers capture the essence and key functions of an organization's e-business initiatives that act as guides through the creative design process to synthesize e-Marketing and branding strategies. The designs capture an organization's brand and drive traffic to the web-site.

Process

The next step along the Technology Solution Lifecycle is Process. In broad terms, this step includes three elements: business process redesign, revenue / cost impact analysis, and an assessment of the impact on the extended enterprise. A long-standing traditional notion in the IT industry is the concept of envisioning the business process first, prior to applying the information technology solution that could enable the business process. As Michael Hammer indicated in his article *Reengineering Work: Don't Automate, Obliterate*, "We have the tools to do what we need to do. Information technology offers many options for reorganizing work. But our imagination

must guide our decisions about technology – not the other way around. We must have the boldness to imagine taking 78 days out of an 80-day turnaround time, cutting 75% of overhead, and eliminating 80% of errors. These are not unrealistic goals. If managers have the vision, reengineering will provide the way” (Hammer 1990).

Hammer’s article was published in 1990, long before the emergence of the Internet as a strategic (and essential) channel in supply chains or distribution networks. However, Hammer’s core point is still very applicable today. If an organization wishes to formulate a technology-based strategy, the core business process must first be developed (or reengineered) to fully leverage this new channel. To date, there’s no better illustration of this principle’s applicability to the Internet than with the Dell Computer Corporation. Prior to launching Dell Online, Dell overhauled and streamlined key business and manufacturing processes. In short, Dell incorporated modularity into their product design, restructured logistics requirements with key suppliers, launched cell-based assembly operations towards lean and flexible manufacturing, and negotiated longer-term contracts with 2/3 fewer suppliers. As a result, Dell PCs were not manufactured until customer orders were received (made-to-order), thus completely bypassing the existing retail distribution channel. Again, this Dell Direct Model enabled the ‘disintermediation’ of their existing retail distribution channel long before the emergence of the Internet. This enabled Dell Online to seamlessly extend their operations through the Internet channel as natural progression that comprehensively supplemented their existing processes already in place.

The ROI on this investment is simple to calculate. Customer orders via the Internet were simply validated and e-mailed to production. Since customer orders were already made-to-order, manufacturing plants were oblivious to orders received over the phone versus the Internet. This not only saved sales agent’s time, but it also allowed Dell to increase quotas for sales agents handling orders from the Internet. In addition, to increasing inventory turns and reducing the amount of antiquated parts and PCs sitting on retailer’s shelves. Dell also linked technical manuals (that were already developed for help-desk technicians) to the web-site. This not only reduced the volume of calls to the help-desk, it also reduced the length of the average call to the help-desk.

The key in the Process stage is to design and / or reengineer the business processes first, prior to fully launching the strategy, to insure the seamless and successful utilization of the this new Internet channel.

To realize positive business impact from an e-business initiative, an organization must identify what it wishes to improve or create. The Revere Group’s goal in the Process stage is to identify process innovations associated with e-business initiatives. They first work through an "as-is/to-be" gap analysis and then apply best practice frameworks to the uncovered issues. The best practice frameworks include:

- Process models
- Proven methodologies
- Functional architectures
- Business process innovations samples

Build

The next step along the Technology Solution Lifecycle is Build. This stage includes the physical build-out of the organization's technical infrastructure and application architecture necessary for the new strategy. This stage also includes the formal development and systems integration of the new Internet-based information system. Many of the traditional steps in the systems development process include requirements structuring, systems analysis, technical design, and implementation. Significant technical developments such as RAD (rapid application design), CASE tools, beta releases and beta sites have expedited this entire process. Other issues to consider during the e-build stage include scalability, security, personalization and interactivity.

The Revere Group's methodologies and technical frameworks expedite the process of building and implementing business plans. The Revere Group has developed a Process Management Methodology (PMM) based on the Project Management Institute's (PMI) Project Management Body Of Knowledge (PMBOK) model. PMI is a global organization recognized for its leadership in establishing a common set of project management practices. Following are the elements of the Revere Group's methodology that improve upon or exceed PMI guidelines:

- Process methodology also includes our consultants' collective experiences on hundreds of projects under management.
- PMM consistency by assigning to every project a Project Management Advisor (PMA) responsible for assisting/mentoring project managers and ensuring project execution quality.
- In the event a client pursues several initiatives at once, a Project Management Office (PMO) is developed to oversee all projects at one client site.
- Projects are executed using predefined "practice sets"—a flexible set of guidelines specifically developed to guide the design, development and implementation of a particular type of application solution.

Although this stage may be technically challenging, by the time an organization reaches this point in the lifecycle, the major decisions have already been made for all practical purposes. The remaining decisions are tactical in nature and better left to those experts.

Manage

Several options are available to organizations for the ongoing manage stage in the lifecycle. Application Service Providers (ASP) such as Breakaway and US Internetworking offer viable alternatives to organizations wishing to avoid large up-front systems development time and cost. Many of these organizations offer attractive software lease arrangements, along with scaleable networking options. Some of the benefits of the ASP business model include;

- Lower entry investment with no capital expenditures required
- Fees aligned with a company's growth via a pay-as-you-go user, per month service metric
- Management of integration, maintenance and cyclical upgrades to software and hardware
- Dramatically lower total investment for the customer
- No incremental IT headcount required at company's location

Another alternative for organizations is Managed Service Providers (MSP). MSPs are available to organizations wishing to outsource their *entire* infrastructure and networking operations. The traditional providers include IBM, EDS, Oracle, etc.

Analyze

The final stage in the Technology Solution Lifecycle is measuring the return from the strategy. This is a crucial and essential step. Performance indicators need to be established to monitor both the *operational* and *financial* performance of the strategy. If the strategy is not performing to standards, improvements must be made or the organization must exit the strategy. Tools such as key performance indicators (KPI's) and Click Stream Analysis are available to measure operational performance and effectiveness. Basic financial performance indicators include ROI, productivity ratios, and profitability measures.

All business initiatives are engaged with the expectation of results. The Analyze methodology ensures the results are either achieved or the business initiative investment is reevaluated. The Revere Group guides an organization through the evaluation in the Analyze stage throughout the Technology Solution Lifecycle -- starting with a definition of expectations and ending with invest/divest decisions. The Analyze methodology is built on the following principles:

- Net positive returns -- financial or otherwise -- are the basis for justifying every business initiative
- Expectations are predefined measurements of success
- Measurements of success should be tracked and updated throughout the Technology Solution Lifecycle
- The scope of e-business returns extend beyond traditional ROI

By transforming these four principles into a full lifecycle methodology, this has created the ability to build expected results and measurements into the core of e-business solutions. There are three key deliverables of the Analyze methodology:

- e-Business Case
- Measurement Plan
- Invest/Divest Initiative Evaluation

e-Business Case

The Business Case is used to frame and then capture the expected results of an e-business initiative. The Business Case is used to complete impact assessments, calculate ROI, NPV, IRR, and support invest/divest decisions. The Revere Group's methodology analyzes both quantitative and qualitative measurements. ROI, channel cannibalization, increased revenue, increased margin and increased on-time delivery of the product or service are examples of quantitative measurements. Qualitative measurements are those that are difficult to measure but are critical for success, such as customer satisfaction, improved customer service, understanding a visitor's behavior when using an on-line store, and the ability of the on-line community to generate loyalty. This approach defines the window of opportunity during which the actual results from the initiative are evaluated against the plan.

Measurement Plan

The Measurement Plan is a detailed definition of:

- The metrics that will be tracked
- The goal for each metric
- How and where the metrics will be tracked
- How often the metrics will be reviewed

Invest/Divest Initiative Evaluation

The Revere Group's experience dictates that the evaluation period for e-business initiatives should typically occur within six months. The final deliverable in the Analyze process is to evaluate actual results against the business case plan. With the measurements gathered in the Manage step, this can help with an invest/divest decision. The "invest" case dictates further planning for expanding the initiative. The "divest" case may indicate the end of the initiative or it may indicate that further analysis is required to guarantee success of the initiative. In the latter case, The Revere Group can assist clients with reevaluating the Business Case and the overall e-business strategy in light of actual results.

Once this analysis is complete and established as an ongoing process, the organization's overall technology-based strategy needs to be re-evaluated. In effect, this brings us back to the beginning of the Technology Solution Lifecycle.

V. CASE STUDIES

Case #1: IPIX (CRM)

Interactive Pictures Corporation (iPIX[®]) is headquartered in Oak Ridge, Tennessee with co-headquarters in Palo Alto, California. Prior to their initial public offering on August 5, 1999 the company was already recognized as a leader in interactive photography and immersive imaging for the Internet. The company's patented technology changes the way people create and view images, immersing them in a 360° x 360° spherical environment. Viewers can easily navigate IPIX[™] images on a personal computer screen by moving a cursor inside the image. Leading companies use IPIX[™] technology in their online marketing and e-commerce initiatives. In fact, mega-sites such as eBay and Realtor.com[®] are using PIXcast[™] to integrate a dynamic imaging layer into their web sites and iPIX imaging can be found on 22 of the top 25 Media Metrix web sites. iPIX currently serves over 30 million image views per day on web sites worldwide, a statistic that is already exceeding previous image view projections!

The company earned triple digit sales growth during 2000 to nearly \$41 million in revenues by the end of third quarter 2000. Although iPIX had not earned a net profit as of the end of third quarter 2000, gross profits were soaring faster than revenue growth and company officials were optimistic about the future.

Despite these prospects for a phenomenal future the company had significant challenges to overcome. First, the company was growing at an incredible rate. The increased customer accounts and the associated exponential growth in images served per day were causing severe strains in infrastructure and networking capacities. In addition, the complexities from serving

customers on a global basis with timely and accurate exchange of data and images were mounting. iPIX's e-strategy was to provide world-class personal customer service to their global customer base and exceed customer expectations.

In an attempt to overcome these challenges and achieve its e-strategy, iPIX re-thought its e-functions and triangulated in on these challenges. First, in partnership with the Chicago-based consultancy Bridge Strategy Group, a recognized leader in e-business strategy development and implementation, iPIX conducted a rigorous application selection process to assess the functional, technical and architectural fit of several leading CRM applications. Second, out of this partnership with Bridge, iPIX selected Vantive Enterprise software to personalize their customer service. The iPIX customer contact center will have access to complete customer histories, including previous calls and orders and current order status, as well as a full resolution knowledge base. These tools will allow iPIX to offer tailored and speedy solutions for each customer. In addition, the software will allow all iPIX departments to share vital information about promotions, distribution and orders. Third, iPIX selected The Revere Group as a business process consulting and integration partner.

Thus far, the results from this e-strategy have been mixed. iPIX, along with every company in the Information Technology industry, has been significantly impacted with the devaluation of the IT industry during 2000. However, from a business process and delivery perspective, iPIX is commonly regarded as the 'first-mover' in this market. iPIX is recognized for superior customer service and for providing an industry-leading technical solution.

Case #2: PeaPod, Inc.

Peapod, Inc. was founded in 1989 by brothers Andrew & Thomas Parkinson. Headquartered in Skokie, Illinois, Peapod provides services locally in eight metropolitan markets: Chicago, San Francisco/San Jose, Columbus, Boston, Houston, Austin, Dallas and Long Island, and nationwide through their "Peapod Packages" service. The total number of customers was approximately 90,000 by the end of fiscal year 1998. With 1998 revenues of \$69 million, Peapod captured approximately 30% of full-service online grocery sales and became the nation's leading Internet grocer.

Originally, PeaPod fulfilled on-line orders by picking, packing, and delivering grocery from their allied traditional supermarkets in each market. As the grocery industry consolidated, a potential conflict of interest emerged between PeaPod and those independent grocers, especially over customer and brand ownership. PeaPod's customer service was at stake when these partners became increasingly wary of sharing strategic information. Consequently, their revenue model was in question unless the company could find a proper way to handle their relationship with these partners.

Realizing logistics as the key to their problem, PeaPod reorganized their logistical business unit and moved from original supplier/retail-based fulfillment model to a centralized, dedicated fulfillment model.

The theme of centralized fulfillment is centralized distribution and inventory management. Under the new model, all orders are picked, packed and delivered from dedicated inventory at

centralized warehouses, where Peapod maintains control of the fulfillment process. The centralized model supports increased product offerings through the use of “perimeter” retailers (e.g. HBA, perishables) and promotes delivery efficiencies by allowing certain items to be cross-docked on the day of delivery, thus eliminating the need to warehouse additional products. A series of analyses were done in terms of warehouse layout and design, route leveling, and capacity requirements at different markets. Moreover, the company upgraded their picking devices, and leveraged the Internet to manage their supply chain.

So far the company has established four centralized distribution centers in Chicago, San Francisco, Long Island and Boston. PeaPod expects this new fulfillment model to bring benefit to the company in the form of increased control over customer service quality and reduced overall order fulfillment costs. This improved cost structure then give them the flexibility to reduce customer fees, resulting higher customer demand for their services.

The new model also means that PeaPod continues to receive goods from major wholesalers in various markets, such as Jewel Food Stores in Chicago, Walgreens and Andronico’s in San Francisco, and the Stop & Shop Supermarket Company in Boston. This allows the company to keep their low prices and share cross-marketing efforts.

PeaPod is a typical example that shows how companies can redesign and manage their supply-chain when their e-strategy causes conflicts among their strategic partners. However, like other e-retailers, PeaPod still cannot generate enough volume to make the margin and for the company to realize the proper return of its e-strategy. As more and more brick-and-mortar grocers – their partners, are setting up on-line stores, the company now faces serious question of how to compete and win over those competitors in the cyber business arena. A Dutch company purchased PeaPod late in 1999.

Case #3: National Transportation Exchange (NTE)

Formed in 1994, NTE, formerly The National Transportation Exchange, is privately held and based in Downers Grove, Illinois. In March of 1995, it launched the beta version of the first on-line transportation exchange, and very quickly, full production implementation was ready by August of that year. In 1996, the exchange started serving a small segment of the industry – dry freight in the Midwest. The operation has grown ever since to contain more than 600 member companies today.

There have been huge inefficiencies in the \$400 billion trucking industry. First, the complex trucking routes create a great challenge for logistics planning and coordination. Some estimates say that 30-50% of the industry’s capacity is underutilized. In addition, the trucking companies have to accommodate the random shipping needs of different companies. As a result, it is estimated that over 70% of the trucks on highways will return empty. Finally, there is a lack of timely and effective communication mechanisms. On one hand, trucking companies does not know to whom that they can sell its extra capacity on the road. However, on the other hand, customers found it very difficult to find a trucker for their ad hoc needs.

NTE's e-strategy focuses on solving the most critical issue of the industry: lack of effective mechanisms with which to establish supply/demand market matching and pricing of transportation capacity with shipping needs.

As they found out, there are significant difference between the shippers and truckers. While a shipper usually has an information horizon of 1-12 months, a trucker typically has an information horizon of 9-12 months. Therefore, they created a business e-marketplace to mediate this difference and enhance information flows, matching unused capacity with loads waiting for pick-up. (e-function)

As a neutral third-party, NTE operates the on-line exchange based on standardized processes for matching demand and supply. The exchange provides a public trading place for member shippers and carriers to buy and sell transportation capacity at dynamically determined prices. In addition, they quickly developed applications that provide a standard means for data capture and reporting. Their system will automatically filter tenders based on a company's business rules, leaving only those compatible trading opportunities.

The exchange has created a great impact on improving the information visibility and reducing waste and inefficiencies in the industry. Most trades are made within 3 hours after a shipment is tendered. Both member shippers and carriers are already enjoying the financial benefit that it brings. On average, the exchange saves customers 15-30% over their traditional shipping costs, and raises the profit from \$30-50 to \$150-500 per TL carrier.

Case #4. DMA

In the restaurant industry, the steady growth of chain restaurants throughout the country created the need for vendors with national capabilities that can provide a wide variety of food and food service items to all of a chain's stores at an agreed upon, competitive price, supported by timely delivery and detailed reporting services. In response, several large national food service distributors appeared. However, their appearance directly threatened the prospects of their regional counterparts.

As a result, about a dozen years ago, a group of 14 large, independent regional distributors joined together to form Distribution Market Advantage (DMA), serving the nation's leading national and regional restaurant chains.

Each of the 14 members is among the largest distributors in their markets. Collectively, they operate more than 50 large warehouses, approximately 3,500 trucks, and carry 12,000 items. Together, they generate \$9 billion in combined sales and serve every portion of the contiguous United States plus Alaska and the Caribbean.

As a cooperatively owned marketing organization, DMA consists primarily of a sales staff that calls on chain restaurant buyers to set up national distribution plans, and a staff that provides the administrative and reporting services that members and customers need.

Under the master distribution program, all DMA members provide products at the same price to all of a specific customer's stores in their markets. Each member receives its own orders from

the local stores, delivers the products, invoices the stores, and pays a fee to DMA for the sales and management services.

While DMA was enjoying quite a success in serving about 30 chain restaurants, which together operate approximately 4,000 individual restaurants, its members' regional focus and their individual proprietary order processing system were the major obstacles in competing with national distributors.

The national distributors, such as Sysco and Alliant, were known to be working on a web-based system. However, the differences in the multiple systems used by different DMA members were starting to become an operating issue for the restaurant chains. For example, when a store manager is transferred from one state to another, the ordering site and ordering process of the DMA member serving the store can be quite different from what the manager was using previously.

In response to this problem, about two years ago, the DMA members decided pursue an e-business solution – revamping its customer-facing ordering system. The project was twofold. On one hand, the 14 members were determined to collectively build a centralized, Internet-based customer ordering and reporting system for their national accounts, thus eliminating their hassle of working with the many different fax, phone, and dial-up ordering systems being operated by the individual distributor warehouses. On the other hand, each distributor must be able to use the site's source code to set up their own similar web sites that are customized with their own names and logos.

The centralized system provides a common “look and feel” order entry interface that can be accessed through the Internet by each store of every chain customer. When the user enters an ID number, the site automatically recognizes the store and its distributor and calls up the inventory and ordering screens from that distributor. The system allows users to fully search and utilize display capabilities, but only products and pricing authorized under the chain's master agreement will be available to the store placing the order. Within seconds after the order is finalized, it is electronically forwarded to the distributor and an electronic acknowledgement is sent to the store. Each evening, members download to the site any products being added or deleted from their own inventories so the information is available to stores placing orders the next day.

Started in the summer of 1999, the project went through four stages. The first stage was a series of intensive Joint Application Development (JAD) sessions to identify a list of specifications of the common web site but also leaves the room for each member to retain certain of its own characteristics that would be compatible with its other business systems.

Once the specifications were defined, the project moved into the second stage in which multiple phases of prototyping were conducted. As each phase of the prototype was completed, it was installed so that the members could access and evaluate it from their own offices.

The third stage was testing. Reality checks using sample orders were conducted on the relatively complete prototype to determine whether the orders were accepted and managed in an acceptable fashion. In addition, robotic software driven stress test were used to ensure that the site could

handle several hundred different orders at the same time, and that it could consistently handle, over a long period of time, the thousands of orders expected each week.

The last stage began after the prototype passed all testing. In this stage, the actual site was constructed, and the implementation of the system was carried out in phases with three or four distributors being brought on-line at a time.

DMA is now in the process of presenting a seamless, state-of-the-art, cost effective and responsive national distribution of products. Their e-business solution streamlines the sales and order processes, improves order accuracy and reduces customers' order discrepancies.

VI. DISCUSSION

The case studies discussed in section VI provide excellent illustrations of utilizing The Revere Group's e-business management model, the Technology Solution Lifecycle, to enable organizations to fully leverage an e-business strategy. The Revere Group, however, is not the only organization that offers an e-business management model. The purpose of this section is to provide an overview of other e-business management models from industry. Comparisons will be made to the Technology Solution Lifecycle, with an emphasis toward highlighting the common (key) ingredients from each.

This first of such models comes from the Electronic Data Systems (EDS) corporation. Founded in the late 1960's, EDS is the second largest provider of Information Technology services (second only to IBM) and employs more than 125,000 people worldwide. EDS's e-business management model is entitled IMPACT and was developed by Miles K. Davis and Margaret Anne McPhee (Davis 2001). At a high level, the IMPACT model is split into three areas (Organizational Assessment, Organizational Design, and Organizational Implementation). Each area is then split into two phases (six phases for the overall IMPACT model). Organizational Assessment's first phase is to establish the 'case for change' which begins by providing the overall context, scope, and objective for the transformation. The 'case for change' consists of determining the imperatives for change, the change vision, the path for change, and the overall business case for change. The second phase includes understanding the 'as-is' environment. This phase involves developing of an understanding the client's current environment and management practices. Three types of analyses are undertaken: business processes analyses, technology analysis, and organization analysis.

Organizational Design's two phases include designing the 'to-be' environment and the detailed planning phase. The 'to-be' environment (or IMPACT Phase 3) is the innovate phase. This phase entails the determination and documentation of the client's expectations of the future environment. In this phase, the team defines new processes, technology, and organizational elements to achieve breakthrough results in performance. To achieve this goal, EDS and the customer work in partnership envisioning the "new state.". The innovate phase includes the following activities: identify and review best-in-class business practices, benchmark the customer's current organization, processes, and technology against the best-in-class and finally reviewing state-of-the-art organization and technology enablers to support the customer's vision.

A planning phase (or IMPACT Phase 4) follows the ‘to-be’ phase, during which a gap analysis is performed that compares current organization, process, and technology to the envisioned To-Be scenario. Implementation plans are developed ensuring the consistency of objectives and assumptions across To-Be designs, while also identifying all dependencies and resource requirements. The planning phase includes the following activities: creating integrated implementation plans, developing timelines and schedules, and quantifying investments and resources required.

Organizational Implementation includes the build-out and refinement phases. The build-out phase or alternatively called Achieve (IMPACT Phase 5) includes execution of the implementation plans. The following activities are include in this phase: construct developed environment, conducting a pilot, build and prepare any new technology needed, build and prepare organization, continue communications to all stakeholders—including constituents, where appropriate, deliver training (as required), and evaluating implementation success. The final phase (IMPACT Phase 6) is appropriately named ‘evolve–refine and improve’. Organizational change, process, and technology measures that were identified during the To-Be design are evaluated. Ongoing measurement, data capture, and reporting processes are established or refined. A change control process and board may be established to capture, review, and schedule improvement activities and to package improvement activities into releases.

To conduct a proper comparison between EDS’ and The Revere Group’s e-business management models, one must first acknowledge the obvious organizational differences between these two companies and their targeted client base. EDS has been in business for over 30 years, employs more than 125,000 people, and as such, can target both Tier 1 (large multi-national organizations) as well as Tier 2 (middle sized organizations). The Revere Group, on the other hand, has been in business for nine years, employs 500 people, and primarily targets Tier 2 sized organizations. As a sheer result of these organizational differences, there are a number of pragmatic (yet very noteworthy) differences between EDS’ IMPACT model versus the Revere Group’s Technology Solution Lifecycle. For example, The Revere Group’s e-business management model is functional in nature and EDS’ e-business management model is more horizontal (process) driven. This is evident by a simple side-by-side comparison of the two different models.

	IMPACT MODEL	e-SOLUTIONS LIFECYCLE
Phase 1	Establish the Case for Change	Strategy
Phase 2	Understand the As-Is Environment	Marketing
Phase 3	To-Be, The Innovate Phase	Process
Phase 4	Plan the Implementation	Build
Phase 5	Achieve	Manage
Phase 6	Evolve-Refine and Improve	Analyze

The Technology Solution Lifecycle is more geared towards defining how e-business can be integrated functionally across a mid-sized organization, with special emphasis in the Marketing and the detailed Analyze financial analysis areas. The IMPACT model is more project (or

process) driven in defining how e-business should be horizontally integrated across an entire enterprise, with a special emphasis in human resource utilization and enterprise alignment areas. Again, this analysis not intended to criticize either model, but rather, it's more of a function of whom the respective e-business models are intended to serve and benefit.

Despite these differences, however, there are a greater number of significant similarities between these models that need highlighting. For example, both models place heavy emphasis on e-business strategy formulation, project planning, and quantifying financial returns from e-business investments. In fact, at a high level, both models have the following approach: e-Business Strategy Formulation, Planning, Build-Out, Manage and Re-Evaluate. In addition, both models are flexible and adaptable across multiple industries and across a variety of different types of technologies. Indeed, both companies have numerous case studies that document successful e-business applications utilizing their respective e-business management models. Both models also place special emphasis on the evolutionary nature of adapting e-business initiatives. That is, both models actively encourage the re-evaluation and re-assessment of an organization's e-business strategy (post implementation of an e-business initiative), which then begins the cycle again of incorporating e-business into an organization.

Another e-business management model in discussion comes from the International Business Machines Corporation (IBM). With revenue of \$87.5 billion and total number of employees of over 300,000 in 1999, it is not only a giant in providing information technologies, more importantly, it is the world's largest provider of information technology services. IBM Global Service is one of the major growth engines of the company, constituting almost 40% of its total revenue in 1999. "e-business" is the most explosive segment among all the services provided, in 1999, revenue from "e-business" services increased 60% as compared to the average 11% for the overall service division.

Similar to that of EDS, IBM's e-business management model is also process oriented. In particular, it consists of the following four steps:

1. Determine e-business initiatives. In this stage, the key e-business drivers confronted by the organization will be studied to form the objective of the e-business initiative and its application requirements.
2. Evaluate current e-business functionality. IBM offers a tool, called "e-business adoption cycle", to help organizations assess their existing e-business functionality, information technologies (IT) infrastructure, and problems and concerns of e-business development. The "e-business adoption cycle" indicates that companies move through six common phases (in three clusters) in their evolution to e-business: awareness and presence, pilot and adoption, and integration and transformation. A company must overcome the "security chasm" before advancing to the second cluster – conducting online transactions. Then at the later part of the cycle, it must cross the "business-value chasm" – to rethink its business strategy in integrating the web with core business processes such as customer relationship management, supply chain management, knowledge management, and operations – to realize an e-business model. In addition, this adoption cycle can be used to direct resource prioritization and allocation to achieve the e-business objectives.
3. Select an e-business operations model. Operations models are the key to IBM's e-business management. An operations model is the target environment, tied to IT investments and

capabilities, that the organization must implement in order to achieve e-business objectives defined earlier. Each operations model has a unique value proposition, organization/culture, IT focus/scope, logical common function, middleware and overall infrastructure architecture. IBM identified five types of e-business operations models in a matrix form by two parameters: location of the e-business environment (external vs. internal) and primary e-business objective (new business vs. efficiency/effectiveness). In the internal environment, the *e-commerce model* increases sales and profitability by leveraging the Internet as a new distribution channel and by customer relationship management (CRM). The *e-process excellence model* focuses on improving the effectiveness and efficiency of an organization's internal processes. In the external e-business environment, the *extranet model* aims to provide efficiency across multiple organizations through the use of enterprise resource planning (ERP) or supply chain management (SCM) systems. By maintaining a network of suppliers, employees, distributors, retailers, and consumers, the *virtual-community model* not only achieves business efficiency, but also improves customer intimacy. Finally, the *above-the-e-line model* enables the organization to develop new products and markets through implementing new business models and business-to-consumer processes.

4. Identify service areas and implement e-business initiatives. In this phase, organizations will define the activities under the selected operations model, and associate them with the four service areas – managing transition to e-business, integration of process and infrastructure, operational performance, and expert sense and respond – offered by IBM.

Comparing with The Revere Group's e-business management model, IBM put much more emphasis on IT infrastructure investment for conducting e-business. Each selection of e-business operations model is tied to a particular IT environment or architecture. In other words, those operations models are in fact the guidelines of IT investments to achieve e-business goals. This is understandable according to the nature of the company. Hardware sales contribute the highest percentage of total revenue, and services, software and component (OEM) technology as a whole provide more than half (in fact, nearly 60 percent) of IBM's revenue. Therefore, such a model can effectively drive the cross-sale of its software and component business. As a matter of fact, most of the successful e-business stories are associated with some deployment of IBM product, such as IBM Net.Commerce, Net.Data, DB2, and IBM RS/6000[®] server.

In addition, this model is different from that of The Revere Group's in its specialization of service areas. As we said earlier, IBM has shifted its focus from creating innovative technologies to helping customers use them. Moreover, it is anticipated that sometime within the next five years, more than half of the revenues and workforce will come from services. To manage this huge business efficiently, IBM must build a knowledge pool that targets to different e-business problems systematically. Moreover, the multi-billion company also has the deep pocket to develop such specialty. Therefore, landing an operations model to specific service areas is an essential part of its model. On the other hand, the much smaller service practice of The Revere Group (\$70 million vs. \$38 billion of revenue) does not allow the company to develop such specialty services. Therefore, there is no such clear differentiation of service areas. Consultants are expected to work across areas. Lastly, unlike The Revere Group's model, this model does not include a final assessment of the return of e-business initiatives.

Despite those differences, it can be shown that, at a higher level, this model also follows the common procedure of: e-Business Strategy Formulation, Planning, Build-Out, and Manage, with the exception of Re-Evaluate, although the model does recommend a multiyear plan for e-business evolution when there are multiple e-business initiatives. The commonalities are shown in the table below:

	IBM e-BUSINESS MODEL	TECHNOLOGY SOLUTIONS LIFECYCLE
Phase 1	Determine e-business Initiative(s)	Strategy
Phase 2	Evaluate Current Functionality	
Phase 3	Select e-business Operations Model	Marketing
		Process
Phase 4	Identify Service Areas and Implement	Build
		Manage

This chapter has focused on e-business management models. Despite this shake-out of dot-com companies during 2000 / 2001, the key business drivers leading organizations to adopt Internet-based solutions still remain. This chapter discussed those key business drivers and illustrated how those drivers are enabling a host of new opportunities (and challenges) from the traditional operations of an organization. However, the methods to evaluate these organizations in the public market place have changed significantly. Gone are the days of evaluating new venture start-ups based on burn rates, over-inflated revenue estimates and the vita of a silicon-valley cowboy. The market has forced companies to focus, once again, on the basics: cost, quality and profitability. A critical ingredient towards successfully achieving these 'basics' is a long-term focused and profit-orientated e-business management model. One such model, The Revere Group's Technology Solution Lifecycle, was presented and explained in great detail. Four case studies were presented to illustrate the application of the Technology Solution Lifecycle e-business management model. In addition, two other e-business management models (from EDS and IBM) were discussed and compared with the Technology Solution Lifecycle. Common ingredients from each of the models were presented.

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VIII. APPENDIX

The Revere Group's Technology Solution Lifecycle.

