ISRC *Notes* - February 1998

Managing in an Era of Disruptive Technology

Based on Presentations by Annette Tonti- Vanguard Group, L. Russell Records- Computer Sciences Corporation, John Howell- J.I. Howell and Associates, Derek Davis- Conoco Inc. and Rusty Brazil- Altra

1. Overview. The February 1998 ISRC seminar was a special full-day affair, presented in conjunction with the University of Houston College of Business Administration's Energy Institute. The seminar, entitled *Managing in an Era of Disruptive Technologies*, examined how emerging technologies are fundamentally changing the rules of competition, with a focus on the energy industry. The seminar opened with a high level perspective of how to leverage advances in technology to attain new business value, presented by Annette Tonti of the Vanguard Group. The afternoon session began with Russell Records of Computer Sciences Corporation (CSC) discussing strategies for managing in an environment of technical ambiguity. This was followed by a panel discussion featuring John Howell of J.I. Howell Consulting speaking on knowledge management, Rusty Brazil of Altra Energy Technologies on trading systems for the deregulated energy industry, and Derek Davis of Conoco on facilitating inter-company collaboration through information technology.

2. Competing through technology. In the Industrial Age, the three components necessary to create value were land, labor, and capital. In today's Information Age, the principal component for success is the ability to leverage technology to add value to the business process. This concept is based on two Laws of Disruptive Technology: Moore's Law, which states that every 18 months computing power will double and the cost will remain constant; and Metcalfe's Law, which states that the value of the network increases as the square of the number of users. Combined, these two laws lead to technology drivers that support emergent business trends. Four of the more significant technology drivers and their impacts follow.

- Ubiquitous Bandwidth

  This driver is the ever-expanding telecommunications capability to deliver comprehensive information and service, anytime and anywhere. It includes narrow-band applications such as e-mail and "push" technology (e.g., PointCast), mid-band applications such as pictures and graphics transmission, and broad-band applications such as streaming video. Enabling technologies include the Internet, fiber optics, and wireless communications. Together these technologies are being combined in unique ways that lead to new forms of multimedia information delivery and the development of new forms of micro-payment information exchanges. They may transform many businesses and the way products are sold. Instead of buying books and magazines, people may buy articles and information on pre-defined topics of interest. Instead of buying executive education in the form of one day, one week and one month seminars from universities, companies may purchase real time educational and training modules that can be embedded in their work environment. In short, bandwidth improvements coupled with improvements in allied technologies are going to have profound effects on the nature of certain products and product delivery.

- Smart Environments

  In a smart environment, everyday objects become networked and intelligent. Examples include smart buildings that sense human presence and turn on or off utilities and appliances, or smart cars that link an engine's onboard computer to the Internet for interactive

maintenance and navigation information. Enabling technologies include embedded processors, wireless technology, and object programming. These smart environments lead to new possibilities for business alliances. For example, utility firms might be able to monitor household energy usage, be able to start and stop certain appliances to take advantage of load leveling and provide services that manage energy costs for end consumers. Such service bundling might provide a means to differentiate commodity products.

- Net-Centric Computing

  The new wave of customer service transcends building relationships with your customers and advances to building a community of customers. Good examples of this include Amazon Books and Virtual Vineyards, both of which use technology to construct not only personalized relationships with individual customers, but also to create a virtual community that binds the customers to each other and the host company. Enabling technologies include agent technology, virtual chat spaces, and message boards. By embedding technology and creating electronic contexts for interaction these net-centric environments can create communities of interest and interaction while in many cases dramatically changing the costs of service delivery.

- Human-Computer Interface

  The use of technology to provide an interface between humans and information systems will set a new standard in customer expectations. For example, the technology exists to install a human-computer interface in cars that automatically monitors road, weather, and engine conditions, provides the location of and directions to the nearest gas station, and delivers personalized news or music via an audio channel. Enabling technologies include wireless technologies, smart appliances, and "push" technology. Such interfaces provide new mechanisms for product and service delivery and provide a further means for product differentiation. They also allow for information capture and exchange at much finer levels of detail which provide opportunities for innovation throughout a corporate value chain.

To succeed in "leveraging technology to provide business value" mastering the notion of context is critical. Value in the Information Age is created through a combination of content, context, and infrastructure. Content is raw or interpreted information. Infrastructure is the physical distribution system. Context consists of the environment surrounding the information, the human-computer interface, and the presentation experience. For example, many newspapers offer an electronic version on the Internet. The news is the content, and the Internet (and related hardware) is the infrastructure. However, the ones that stand out provide a compelling *context*, such as the ability of a user to set up a personalized edition that only contains certain topics or company names. Similarly, AOL has succeeded not through ownership of content or infrastructure, but through delivering context. The emergence of businesses that supply a context for interaction in electronic space will be a critical element of the emerging electronic markets. Altra Energy provides a perfect example of the value of context in the energy industries. They own neither the physical commodity that is being traded, nor the infrastructure over which the commodity is delivered, but they provide a context in which the transactions can be safely, securely and reliably executed.

3. Building Agile Infrastructure. The idea of leveraging technology to provide business value is well and good, but how can this be done in an environment of higher expectations, a more rapid rate of change, increased globalization and geographic dispersion, increased reliance on IT, and more real-time information and decision making? One answer is to create agile information systems infrastructure to enable the agile organizations.

From an organizational perspective, IT agility is based on the following.

- Understanding market forces. You need to be positioned to respond to tomorrow's challenges not just to solve today's problems. This means going beyond asking "what business are we in?" and asking "what business are we going to be in?".

- Understanding business imperatives. IT managers must develop strategic partnerships with business executives to gain greater knowledge of business needs and their relationship to new technologies.

- Building a highly competent technical base. Furnish continuous and ongoing training in evolving business trends and technologies. Increasingly, this training needs to be delivered in a real-time basis and embedded in a specific problem context.

- Building a flexible infrastructure. Include processes for evaluating new technologies, revamping systems infrastructures, and enhancing delivery capabilities. Assume that you must support a set of any-to-any connections, and be able to do this any time and anywhere.

- Reducing turnaround time. Improve the organization's ability to deliver new products, services, and applications within a shortened cycle time.

Four specific steps organizations can take to enhance IT agility include:

1. Building "thin" information systems applications on "thick" infrastructures that move beyond boxes and wires to embedded processes and data that can shorten development cycles and improve systems integration;

2. Using an object-oriented approach for application construction and creating re-usable systems elements;

3. Implementing a knowledge asset management framework that supports retention and sharing of knowledge throughout the organization; and

4. Improving inter-organizational collaboration practices by using groupware technology to improve processes.

4. Energy Industry Applications. The energy industry is undergoing at least two major change initiatives at the same time. The downstream energy business is in the throes of deregulation, while the underlying technology is rapidly expanding (some might even say exploding). This requires significant changes in energy-related information systems and business processes. Two methods that help organizations survive and prosper in these turbulent times are knowledge management and intercompany collaboration.

Successful knowledge management requires changing some deeply entrenched management mindsets. First, managers must accept that the old "knowledge is power" mindset is counterproductive. Knowledge sharing is one of the keys to success in the new environment. Second, managers must realize part of the value created by a new project is not just the business result, but also the knowledge gained (or *lessons learned*) from the project. These lessons should be captured, retained, and built on in future projects. They should also be considered when evaluating the project's outcome.

Intercompany collaboration is becoming a staple of business in today's rapidly changing environment. Managing such collaboration is often problematic. IT is a necessary enabler of effective intercompany collaboration, *but* ….. technology is not the main issue. The critical success factor is the ability of people to work together. E-mail, fax, conference calls, and FedEx exchanges are poor support techniques. A more effective way to nourish intercompany collaboration is through the use of collaborative tools such as Lotus Domino or MS NetMeeting. The Internet is a suitable communications platform, as long as security techniques such as encryption and firewalls are used.

- Principles of Effective Intercompany Collaboration

    - Move the work to the people, not the people to the work.
    - Integrate project teams; that is, build project teams with people from both companies, as opposed to projects teams staffed only by one company or the other.
    - Openly share work-in-process to obtain further input and clarification.
    - Document processes, progress, and open issues.
    - Create an intercompany project reward system.

- Questions About Intercompany Collaboration

    - How can people be motivated to take advantage of technology's ability to reduce cycle time and improve results?
    - How can people be effectively trained to work with the new technologies?
    - How can an "enlightened" company encourage its partner to adopt this approach?
    - Can the Internet continue to support the increasing demands placed upon it?

5. Closing Notes and Coming Attractions. Information technologies are dramatically changing the fundamental rules of business. Further, some of these technologies are moving so rapidly that it is critical for organizations to be forward looking in thinking about the opportunities and pitfalls that these dramatic technological shifts portend. Organizations need to have mechanisms in place to deal with this technological disruption. This includes formal organizational mechanisms to evaluate and test new technologies, an agile infrastructure to enable organizations

to respond quickly to new business challenges, as well as tools and processes to manage information sharing, knowledge management and collaboration between businesses. Doing this while trying to manage the issues of the day, such as the Year 2000 problem, which Russell Records of CSC aptly termed *distractive technologies* makes the process of dealing with *disruptive* technologies all the more challenging.

Our next ISRC event is a roundtable on Enterprise Architectures-- *Developing an Agile and Adaptive IT Infrastructure.* **The Roundtable is scheduled for Thursday, March 26th starting at 8:30am in the Hilton Hotel on the UH main campus.** We will begin the roundtable with brief presentations from Gary Richardson of Star Enterprise and Clark A. McCollough of Exxon Computing and Network Services Company. This will be followed by a roundtable discussion that will address a series of issues related to defining the architecture, aligning with business strategy, selling architecture to senior management, establishing policies and standards while maintaining flexibility, planning for and implementing an adaptive infrastructure, the effect of vendor relations on architecture, and the influence of new technological approaches.

6. ***For further information***

articles

Bala Chakravarthy, A New Strategy Framework for Coping with Turbulence. *Sloan Management Review*, Winter 1997, p.69-82.

Jeanne W. Ross, Cynthia Mathis Beath and Dale L. Goodhue, Developing Long Term Competitiveness through IT Assets. *Sloan Management Review*, Fall 1996, p. 31-42.

web sites

www.altranet.com/ --The Altra Energy Technologies, Inc. website, where you can find out more about online energy trading.

www.mediapool.com/offtherecord/clay.html -- an online discussion of disruptive technologies

www.csc.com/csc_vanguard/btn/intro.html -- an overview of future potentially disruptive technologies from Vanguard