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Massachusetts Institute of Technology
Research Workshop

eBusiness Transformation

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A. Presentation Summaries

Introduction

The theme of this conference was ebusiness transformation. In the first generation of ebusiness, companies pursued a "land grab" strategy. The goal was to get as many customers as quickly as possible, with little regard to profitability or value.

In contrast, the second generation of ebusiness is characterized not by ill-formed business models but by companies transforming their business practices and adding the Internet to the existing business models. Large companies will lead this revolution. Companies that will make the smooth transition to ebusiness will be those who balance an investment in new technology with organizational practices that support and leverage that technology.

A major challenge facing large organizations today is how to make that transition to ebusiness. The tools discussed at today's research seminar -- namely the Matrix of Change and Improvisational Change -- will help companies make that transformation.

Company Challenges

Given the interactive nature of this research workshop, participants described the challenges their businesses are facing. Commonalities among the group included business reorganizations, changing the supply chain, and using the Internet to support communication with customers and employees. Most of the participants were in the process of developing new ebusiness initiatives and facing the challenges of change management. Several participants expressed interest in wireless communications, which will be the topic of an upcoming research seminar in November 2001.

A.1. eBusiness Transformation – The Matrix of Change

Prof. Erik Brynjolfsson

Technology is Not Enough

Early in the advent of a new technology, it easy to believe that the technology will change everything. But as Prof. Brynjolfsson explained, the new technology by itself is not enough. Companies must also make changes to the organization to reap the benefits of technology.

Consider the example of Amazon.com. Amazon did not simply put a web front-end on an existing bookstore. Rather, Amazon built a set of new business practices to support a new business model. Amazon changed the whole concept of how bookstores work. For example, Amazon customizes its interaction with every customer. Using IT to track all of a customer's past purchases, Amazon uses this information to recommend other books to the customer that the customer might like. Amazon analyses the buying patterns of customers who have bought the same book to predict similar books that customers might enjoy. Indeed, Amazon uses seven different recommendation engines to make its tailored recommendations. Customers "entering" the Amazon store are greeted with those
recommendations. Customer can also opt to receive recommendations by email of new books available in their areas of interest. This level of customization would paralyze a traditional bookstore. It would be counterproductive for a traditional bookstore to simply add technology without making concomitant changes to business practices.

**Investment in Organizational Capital**

The need to make changes in organizational practices to support technology investments was made clear in Prof. Brynjolfsson’s study of 753 large firms. This study showed that the ratio of investment in organizational capital relative to IT capital was 10-1. For every dollar invested in technology (i.e., hardware and software), successful firms were investing ten dollars in their organizations (training, new decision practices, and changed incentives). Firms saw these investments as not as costs, but as investments, analogous to capital that would yield a stream of benefits. Firms that made these investments had higher productivity and higher stock market valuations.

The research also revealed that the firms that were the most aggressive in simultaneously investing in IT and organizational capital had disproportionately high benefits. Investing in only IT or only organizational capital gave a smaller boost, but the best benefits came to firms that invested in both simultaneously.

Investments in organizational capital took three forms: Human Capital, Decision Rights and Incentives. Human Capital investments included training, education and hiring practices. Decision Rights were investments that pushed decision-making to the front line. Organizations that disseminate information widely to enable decision-making had better results than those who had centralized or hierarchical decision-making practices. Finally, in the area of incentives, firms that used performance-based compensation had better results than those who promoted in other ways such as seniority.

**Leveraging Existing Assets**

Companies don't have to throw out what they have and start from scratch in order to use the web. Consider UPS, which offered package tracking to customers. Today, one million customers use the UPS website to check the status of their package. Imagine how many customer service reps UPS would need to provide that service by phone. The cost savings of offering package tracking via the web are dramatic, but there are other benefits as well: speed, accuracy, better customer experience, and increased level of trust and appreciation. Linking with the customer more tightly increases switching costs. UPS looked at which assets they could build on, not starting from scratch. UPS had the package-tracking infrastructure in place. Their customers had PCs and used the web. So the costs of offering web-based package tracking were comparatively small: investments in web servers to serve up the web pages and a firewall; the big ticket items were already in place. The UPS example shows how UPS used the web to improve its existing operations.

**Managing Change**

Business practices are the building blocks of all business models. One of the keys to transformational change is to identify which practices can be leveraged in the Internet model. Identifying which practices are a good fit and which ones need to be changed is a key challenge. Just as we have tools to analyze
the engineering stresses in physical objects, we need a tool to analyze the business stresses across business practices. The Matrix of Change is a tool that helps companies analyze their intangible assets.

Coherent Business Systems

The Matrix of Change reveals a fact that few firms consider: that existing business models are built from a coherent system of business practices. Practices tend to complement one another. For example, consider a traditional brokerage firm which has physical retail offices, compared to an online brokerage firm. The traditional firm has a set of interacting practices and assets. For example, the firm has an assigned broker for each customer. These brokers provide personal advice and get to know their customers. The brokers are compensated on how well they serve their customers, and a research staff that provides the brokers with the specialized knowledge to help each customer supports them. In this business model, the brokerage firm charges high fees to clients to offset the investments it makes in its human and organizational assets.

In contrast, the online brokerage charges low fees but does not offer advice or personalized research. Interactions with are via web services and email. Rather than have an in-house research staff, the online brokerage may partner with other service providers and offer more generic information. The online brokerage may even earn revenue from non brokerage-related sources such as advertising.

If the traditional brokerage firm starts thinking, "our retail offices are expensive, let's get rid of them and move to web servers instead," the firm is likely to face trouble. The difficulty will arise because the change involves changing one process in the company without thinking about that practice's interaction with other practices. Deciding to swap a practice without considering its impact on other practices is like trying to buy one shoe. Buying the left shoe without its corresponding right shoe will result in poor performance!

Matrix of Change

By using the Matrix of Change, however, managers see the interactions among their existing practices. They can also identify possible difficulties as they transition from one set of business practices to another.

Continuing with the brokerage example: the Matrix of Change can be used to predict whether the traditional brokerage firms' move to web-based online brokerage service will be easy or difficult.

The first step is to list the practices associated with the existing and proposed business models:

Existing Practices: Traditional Brokerage
- Physical retail front office
- Assigned broker provides personal advice
- Focus on "high net worth" investors
- Specialized research staff
- Commission-based compensation
- Proprietary, custom information
High fees tied to trading

Target Future Practices: Online Brokerage
- Web servers and email-based interactions
- Outsourced, generic information
- Focus on frequent traders
- Salaried compensation
- Alliances with other service providers
- Diversified revenue stream including ads
- Low fees on trading

To use the Matrix of Change, list the old, existing practices down the left-hand side to create a set of rows and list the new, target practices across the top to create a set of columns. Then compare each old practice with each new practice. For example, compare the old practice in the first row ("physical retail front office") to the corresponding new practice in the first column ("web servers and email-based interactions"), noting with a "plus" (+) sign if the practices reinforce each other or a minus (-) if they conflict, or a blank (" ") if the practices do not really affect each other at all. This type of analysis (comparing each old practice against each old practice) quickly shows, for example, that "proprietary, custom information" conflicts with the practice to "charging low fees" because low fees do not create the revenues need to support expensive custom information-creating activities. The result is a matrix filled with a mix of pluses, minuses, and blanks.

The Matrix of Change provides a systematic way to think about business practices and their interactions. It's not that a practice is good or bad by itself, but that certain practices fit with other practices. Transplanting a practice into a different system may not work well if that practice does not fit into that coherent system.

Filling out the Matrix with pluses and minuses also gives an indication of how difficult the transition will be. If the Matrix is revealing a preponderance of minuses, then it's clear that the old and the new practices do not coexist well. In such a case, if the company desires a move to the new practices, then it should make that change as quickly as possible, rather than face a prolonged transition period with both sets of practices. A good analogy is that of Sweden, when it switched from driving on the left side of the road to driving on the right-hand side. Such a move had to be made completely -- it wouldn't do to ease into the transition by asking only the trucks to drive on the right-hand side of the road first and then gradually moving cars over in the second month!

Merrill Lynch Case Study

Merrill Lynch provides an example of how a traditional brokerage could develop a new business model by combining the advantages of ebusiness with the firm's existing assets. Merrill wisely resisted making the leap to a pure online brokerage model. A pure online model would have obliterated Merrill's existing assets, namely its 17,000 financial advisors and its specialized research staff. Obliterating these assets would have eroded Merrill's competitive advantage.
Instead, Merrill created a new model, offering the "Unlimited Advantage" account. Under Unlimited Advantage, Merrill created a one-stop financial supermarket for mutual funds, banking, and a host of other financial services under one umbrella. Merrill shifted the fee structure from a high charge per trade to a single annual fee based on assets under management. The new pricing scheme (1% of assets under management, scaling lower on higher asset amounts) allowed for free trades (besting the online brokers at their own game of low trading costs without giving up Merrill's advantages in service and expertise). The new business model addressed the reality that high net worth individuals were keeping accounts with Merrill to receive advice, but then doing their trades at online brokerages to reduce their costs. By eliminating the cost per trade, Merrill removed any advantage to customers making trades elsewhere -- encouraging these individuals to move all their assets to Merrill.

The lesson from the Merrill case is to be ready to reinvent the business model, not just copy the competition. Using a tool like the Matrix of Change will help companies gain a deep understanding of their assets and how they can leverage those assets in a new business model.

A.2. Panel: Successes and Failures in Managing Change: Lessons from the Field

Moderator, Prof. Jim Short, MIT Sloan School of Business, Executives from British Telecom, Cisco, and Merrill Lynch

Prof. Jim Short moderated presentations by three companies: Merrill Lynch, BT, and Cisco Systems. These lessons from the field explore how different companies view change.

**John Michel, First Vice President, Merrill Lynch**

**Merrill's Move to eBusiness**

John Michel described Merrill Lynch's move to ebusiness practices. The effort began with the desire to replace Merrill's outsourced systems with systems that would help Merrill's 17,000 financial advisors be better able to serve their clients. The application began as a fat-client application and was strictly an internal system. Using the new system, financial advisors had good account information. The downside, however, was that this client-server application was hard to move to the Internet because of security issues. As a result, financial advisors had good access to customer information but the customers themselves did not. By 1997, Merrill saw that Schwab was giving clients online access. Merrill, however, continued to move slowly, waiting for SEC guidelines before rolling out such a service. Ultimately, Merrill devised the Unlimited Advantage approach (described above by Prof. Brynjolfsson).

**Making the Change**

Despite the potential advantages of the new online practices, Merrill's senior management was hesitant to move quickly. Senior management had not grown up with the Internet and weren't sure how to gauge its importance. The crystallizing event that signified the importance of the Internet to the brokerage industry was when Schwab's market capitalization surpassed Merrill Lynch's despite Merrill's greater stature and much larger size of assets under management. That was the wake-up call, the shock that drove the move to Unlimited Advantage.
Leveraging Existing Assets

Some analysts have criticized that Merrill moved too slowly or was reluctant to shed its financial advisors and traditional brokerage business model. Merrill stands by its decisions, however, because its clients continue to say that their relationships with advisors are important to them. Therefore, the advisors are an asset and a competitive advantage for Merrill. To simply copy an online brokerage model would not bring a sustainable competitive advantage (see Prof. Brynjolfsson's presentation). Rather, to maintain its advantage, it is in Merrill's best interests to build solutions that empower its advisors as well as its customers. Indeed, current research by Gomez Associates (2001) found that physical presence was important (22% of online investors are advice directed, preferring to make investment decisions with a professional's input) and that pure-play approaches are out of favor (56% of online investors maintain an offline account, and 24% of them do so to maintain a relationship with their broker). In Internet terms, the "stickiness" of personal service is much higher than that of online impersonal service.

Future Challenges

Some of the challenges facing Merrill include:

- how to manage all of Merrill's online resources as a whole
- how to operate internationally given English language issues
- how to partner with other companies effectively

Dan Moorhead, Director Organizational Research, BT Group

Dan Moorhead described BT's use of the Matrix of Change, both within BT and with BT clients. BT is a sponsor of the Matrix of Change project and an early adopter of the Matrix of Change software.

BT's Use of the Matrix of Change with Corporate Clients

BT is using the Matrix of Change with corporate clients, as part of its Futurescope projects. These projects are shared learning projects, in that BT as a large UK company is facing the same issues as its large corporate customers. So, BT does not claim to have the "answers," but it uses the meetings as a way to pool learning. During the meetings, BT uses the Matrix of Change as a way to help its clients think through some issues or major transitions they are going through. The half-day meetings include a demo of the Matrix of Change software and are offered to strategic clients free of charge. Participants typically include five delegates from the client company, three account team members from BT, a facilitator from BT and a representative from MIT. The objectives for the day are to use the Matrix of Change to surface interdependencies among practices and to gain fresh insights.

BT has run two of these Matrix of Change mini-workshops, one with a financial services firm and another with a third-party logistics firm. The workshop begins with the concepts of the Matrix of Change and ends with the software (the software being more valuable once people understand the concepts). Clients rated these workshops highly, and BT itself has used the workshops as a way to upskill its account teams, helping teams understand strategic issues and act more as consultants than as salespeople.
One of the lessons that BT learned is that the Matrix of Change raises some very strategic conversations that embody long-term change. This builds a stronger relationship with the client organization and helps BT, in the long term, to create products and service that meet change business needs. But, if the sales organization is pressured for short-term sales goals, then the sales people may be reluctant to help customers with long-term change.

**BT's Use of the Matrix of Change Internally**

BT has used the Matrix of Change internally to build a coherent set of change practices. One of the challenges BT faces is that, as a large company, it has had a host of large-scale change programs. Employees are tired of disparate change programs, "another fine program" that leads to change fatigue. The Matrix of Change is not a flavor of the month, but an enabler that helps people understand what is involved in getting to a desired future state. The payoff of the Matrix of Change is an internal vocabulary about change and about what is missing in the current business practices. It's not a change program that launches balloons and hands out mugs, reducing a complex transition into a bumper sticker. People don't like to be patronized. They also don't like 500-page Gantt charts. The Matrix of Change helps people understand the issues involved in a change, the transition interactions, and the implications for planning. It brings multiple parties together and gives stakeholders a forum for dialogue within the shared context of the tool.

**Mary de Wysocki, Marketing Manager, Cisco**

**Application Development at Cisco**

At Cisco, ebusiness transformation started years ago, which has had both benefits and drawbacks. One major drawback was that many of Cisco's applications had to be home grown, which took more time, cost and led to integration difficulties. Today, new application development is done in waves. For example, Cisco executives might identify self-service tools for customers as the target for applications development. Once those tools are adopted and in place, Cisco will tackle a new challenge, such as e-learning.

**The Client-Funded Model**

A key to Cisco's success is its client-funded model approach to funding IT initiatives. Under this model, the CIO does not set IT initiatives. Rather, the vice presidents of each function (such as HR or finance) are responsible for setting the ebusiness vision for their area. They are accountable for that vision and report semiannually to the CEO on their progress. The role of the CIO is to help each area achieve their vision by creating the core enterprise infrastructure that supports individual initiatives. The CIO helps in execution of the vision by providing staff and knowledge, and by ensuring that projects do not duplicate each other.

**Ruthless Execution**

While Cisco's policy on new application development encourages innovation, once an application is developed, the company pursues "ruthless execution." That is, once an application is deployed, it becomes the company standard -- alternate competing applications are not tolerated. Cisco pushes standards ruthlessly so that the company can move quickly and in a united fashion. Multiple competing
IT systems would make it much harder for the company to adopt a new technology or deploy a new practice company-wide. Even Cisco's numerous acquired companies must quickly make the switch to Cisco's standards.

**Response to Economic Change**

Cisco is a ebusiness pioneer, thriving on the changes which the new economy brought. Change was a way of life at Cisco. However, with the downturn of the economy, Cisco abruptly realized that it was used to positive change. It knew how to hire quickly, switch to new technologies, and build new competencies to meet new markets demand. But negative change, namely the economic slowdown, was something for which Cisco was not prepared.

The layoffs of 2001 were the first in Cisco's history. Cisco's approach to managing this type of change was to recommit to its values and to use those values. Values such as Integrity and Fair Play, printed on all employee badges, were manifest in Cisco's complete openness and advance notice of the layoffs planned. Cisco put up an internal website to discuss the layoffs and options. Employees targeted for downsizing knew whom they were and could to ask questions about their options or about the departure packages available to them.

**Metrics**

Cisco is very metrics-driven. The company's approach is to start with crude, easy metrics immediately and then refine them over time. For example, to measure productivity, the company began with a "revenue per employee" metric. But, that metric does not identify whether one division is more productive than another, so the company is refining that metric. For example, developing a recruiting application could improve productivity in HR. The way to measure that could be, for example, to reduce the number of days between when the company identifies it has an open position to when it hires a candidate for that position. Saving even one day in the process can save the company money.

**Corporate Acquisitions**

Cisco is noted for its successful track record in integrating the companies it acquires. The primary reason for this success, de Wysocki said, was that Cisco only acquires companies whose corporate culture fits with Cisco's. If Cisco does not feel that a candidate company's culture will fit with Cisco's, Cisco will walk away from the deal. Cisco also tends to do smaller acquisitions rather than massive "mergers of equals." Cisco will often work with the CEO of the candidate company to devise a plan for how to bring the firm into the Cisco family and how to migrate their products to fit into Cisco's existing product strategy. This acquisitions strategy ensures a smooth integration of the new company and the retention of the acquired company's most valuable assets: its people.

**A.3. Improvisational Change: Lessons from the Sloan Class of 2001**

Professor Wanda Orlikowski, Sloan School of Management

Prof. Orlikowski presented a new approach to managing change within organizations.
Traditional Planned Change Approach

Traditional change theory emphasized the "planned change" approach. This approach assumed that most of the changes that would occur could be anticipated before the change process began. The change process was seen as a discrete event, and the majority of resources for the change effort were dedicated up-front to the planning and design of the change. Simply put, the task was to "unfreeze" the organization from its current state, implement the change, and then "refreeze" the new state. Change was episodic, something the organization built up to, implemented, and then things settled down again and they could maintain the new steady state.

Improvisational Change for Complex, Dynamic Environments

But in today's networked economy, planned change approaches are less effective given the uncertain and dynamic environment. As a result, Prof. Orlikowski proposed that an improvisational change approach might be more useful for managing change. The major tenets of this new approach are:

- Change must be managed as a process, not a single discrete event
- Changes are ongoing, and both anticipated and unanticipated changes will arise
- Resources should be allocated throughout the entire change period to enable experimentation and learning in context of the change.

The improvisational change model adds two additional types of change to the traditional notion of planned change. Emergent changes are changes that were not foreseen under the plan, but that emerge during the course of a planned change. Opportunistic changes are changes in response to an emergent change. Opportunistic change helps an organization adapt to or leverage emergent change.

Improvisational Change Case Example: Sloan Class of 2001

The metaphor of improvisation opens up many new possibilities for managing change. Seeing change as ongoing gives managers new opportunities to exploit and leverage the events that occur. Prof. Orlikowski used the case study of the Sloan Class of 2001 to illustrate improvisational change.

In this example, the MIT admissions office decided to shift from a traditional MBA application process to a web-based one. This part of the change was planned. Admissions officers established a website through which students could submit their applications and check on the status of their applications. As part of the process, the admissions office also instituted a new practice, namely a "chat session" with MIT faculty, during which students who had been accepted into the program had the opportunity to interact with a faculty member. It was an opportunity for prospective students to ask questions as they evaluated whether to choose to attend MIT or a different school.

It was during one of these sessions that emergent change began. Students who had participated in a chat session continued the chat after the session was over and the faculty member had left. As they stayed on and chatted, a new idea emerged. The idea was to create a virtual community in which students could get to know each other before they came to MIT. Students know they are accepted to MIT by March, but they don't begin classes until September. Furthermore, these top students are typically accepted at a number of different schools, so they face the choice of which school to attend. The students in the chat session decided to set up a club online, in which they could share ideas and
thoughts about the school and get to know each other. The students set up the club at Yahoo, establishing a message board and chat opportunities. They sent out e-mails to other prospective students, and then approached Sloan to request a link from the Sloan admissions website to the club website.

The admissions office had not planned on creating an electronic community (especially an independent one hosted outside of the MIT), but as they saw it emerge and they recognized its value. The admissions staff agreed to put a link to the club on the Sloan website, and student participation in the Yahoo club dramatically increased. Over a 6-month period, 300 of the 350 admitted students participated. Later, the students said that participation in the club helped them decide about MIT and eased their fears about events like Orientation, which is generally intimidating because students don't know anyone. Among club participants, orientation felt more like a reunion with friends than a new student orientation.

Analyzing the case showed the three types of change in action:

* Planned Change (implementing the Sloan eAdmissions process)
* Emergent Change (students' idea of starting a Yahoo club)
* Opportunistic Change (admissions office creating link from Sloan website to club website)

The full case showed several emergent changes and resulting opportunistic changes that built upon them, amplifying the success. The admissions office had only planned for a web-enabled process, but by opportunistically responding to the emergent changes, the result was an eCommunity. The lessons learned are to allow for emergence to happen, and to allocate resources over a broader period of time so that the organization can opportunistically respond to emergent changes.

A.4. Break-out Group Reports and Discussion

After Prof. Orlikowski's session, participants divided into discussion groups. The task was to choose an existing change and discuss how the Matrix of Change and Improvisational Change approach could be used to improve that change process. Participants were also asked to compare how the two approaches worked together or where tensions arose.

Role of the Matrix in Radical Change

Using the Matrix of Change, the first breakout group identified the Fleet Bank merger with BankBoston as their target change process. In their analysis, they found that the Matrix of Change useful for framing issues that required radical change, such as a change in vision. They saw the Matrix of Change as helping to frame the problem and to identify potential difficulties. At the same time, improvisational change fit the style of the BankBoston culture, so participants noted that different organizations are more in tune with one of the two different approaches.

Improvisational Change for Distant Events

Using the Improvisational Change model, the first breakout group considered the challenge of overseas expansion. GEA, an Italian consulting company, opened an office in the US three years ago. GEA has seen its planned changes fall by the wayside in light of economic changes such as the 37% rise of the
dollar. Participants concluded that the more distant in time a change will be, the more useful the improvisational approach will be to take advantage of the learning that will take place. Participants characterized this approach as "adjusting" one's way to a solution.

**Matrix of Change as Quick Assessment Tool**

Using the Matrix of Change, the second breakout group chose a shift in the US Postal Service's delivery frequency as their change target. The group was surprised by how quickly they were able to use the Matrix of Change tool (none of the participants had prior experience with it). They found the tool intuitive to use, and by using it they learned a great deal about the business factors quickly. They recommended using the Matrix of Change as a quick assessment tool, and then using the improvisational approach later to evaluate reactions to a given idea. As they saw it, the Matrix of Change lets companies assess what it takes to get to a goal.

**Improvisational Change for Hypothetical Scenarios**

Using the Improvisational Change model, the second breakout group considered a hypothetical scenario of the US Postal Service. They imagined the planned introduction of certified e-mail, the emergence of interest from ISPs, and an opportunistic change in which the USPS chooses AOL as a major partner in the effort. Later emergent changes could include using certified e-mail to support online voting.

**Matrix of Change as Communication Tool**

The second breakout group also noted that the Matrix of Change could be used as a communication tool. Companies could ask different groups in the organization to fill out the Matrix. The outcome would give the company a sense of how different groups in the organization see things. Such a tool may help evaluate whether to make a change within the company or at a greenfield site.

**Comparison of Matrix to Improvisational Change**

Whereas the Matrix of Change is a powerful analytic tool for planning change, the Improvisational Change model is more suited to thinking about ongoing changes and hypothetical change. As such, the participants found the two approaches to be very different from each other.

**A.5. Workshop Wrap-up**

Prof. Erik Brynjolfsson, Prof. Jim Short

**Matrix of Change: Uses and Future Research**

Discussion throughout the day pointed to new uses for the Matrix of Change which its creators had not planned. Building on this emergent change, Prof. Short said that further research could be done to use the Matrix of Change with customers, not just internally within the firm. Prof. Short also cited the Matrix's use as a monitoring device and as a communication tool, giving people a vocabulary with which to talk about the issues associated with the change. Finally, the more formal nature of the tool makes it
a counterbalance to improvisational change. MIT will be conducting field-based research with the Matrix of Change, and sponsor companies are invited to participate.

**Disruptive Change and its Impact on Productivity**

At numerous points in time, industries have undergone disruptive changes. For example, GM stock grew 5000% between 1914-1919 and then crashed by two-thirds in 1920. RCA, a pioneer in broadcast radio, had a similar history. The implication for our own time is not to get too swept up nor too discouraged about a disruptive change.

One of the most interesting factors underlying a technological change is its impact on productivity. Prof. Paul David at Stanford conducted an in-depth study of how the advent of electricity affected US productivity. Electricity was available at the turn of the century, but productivity did not increase until 20 years later, in the 1920s. Why was there such a lag?

Prof. Brynjolfsson explained that the lag was due to how factories were structured. Before electricity, factories relied on power from a steam engine or water wheel. To distribute power to machines meant setting up pulleys, cogs and wheels to reach each machine. The energy could not be distributed more than 10 meters, so factories clustered machines around the power source. They did it in three dimensions, creating dense multi-story factories with machines no more than 10 meters from the power source in any given direction.

When electricity came, factories replaced the steam or water with a big centralized electric motor. But, they kept the same factory layout. Factories became quieter and safer, but there was no fundamental change in work practices. It wasn't until 20 years later (probably the time it took for the existing generation of managers to retire) that managers began to rethink why factories were organized the way they were. This questioning led to a reorganization of factories into expansive single story facilities. With electricity, machines did not need to be organized around a power source but could be organized by a new principle: workflow. Once factories were laid out in a way that facilitated natural workflow, factories saw triple-digit increases in productivity.

The lesson is that a technology can transform how business is done, but it is not enough to simply overlay the technology onto existing practices. Businesses need to think more broadly about how the work is done.

**B. Themes**

This half of the report presents the conference from a thematic, rather than chronological, standpoint -- reorganizing the ideas from the conference into a set of themes. These themes cut across and combine the ideas from all of the presenters and audience comments.

**B.1. Introduction to the Matrix of Change**

The Matrix of Change was a central element of the conference in several of the presentations and in the breakout group activities. The Matrix of Change is a method for documenting and understanding how
change affects an organization. The method examines the interactions among business practices, both the existing business practices and the future target business practices. The Matrix of Change can help organizations to understand how the pieces of their organization fit together and

* whether the current set of practices are all mutually complementary or not
* whether the proposed target set of practices are all mutually complementary or not
* whether the current set of practices and the proposed target set of practices are all mutually complementary or not

Understanding these three types of interactions helps an organization to gauge the coherence of the business model, present and future, and to gauge the degree of difficulty of a change effort.

**Components of the Matrix of Change**

The components of the Matrix of Change method focus on the present and future business practices and all of the interactions between these two lists of items. The Matrix of Change consists of five main components:

* a list of the existing practices/characteristics of the business
* a horizontal triangular half-matrix of pair-wise interactions within the existing business items
* a list of the desired or prospective future practices and characteristics of the business
* a vertical triangular half-matrix of pair-wise interactions within the future business items
* a square full-matrix of pair-wise interactions between current and future business items

The point of the two lists, two triangular half-matrices, and a square matrix is to record if different practices tend to complement or to conflict with each other. The elements of the matrices record the degree of complementarity or conflict with a simple +/- symbols. Thus, the two triangular half-matrices and the square matrix contain entries of:

* a "+" signifies a positive or complementary interaction
* a "-" signifies a negative or conflicting interaction
* a blank signifies no known interaction

**Matrix of Change Software**

People can easily create a Matrix of Change using pen and paper (and the breakout groups created such a Matrix of Change in the space of half an hour). However, a software-based version of the Matrix of Change adds substantial levels of functionality. An early version of this tool, available at ebusiness.mit.edu/moc, provides a way for creating, managing, and accumulating knowledge around change matrices. The main screen for this tool shows a given Matrix of Change, complete with the item lists and associated interaction matrices. Although this screen is no different in appearance from the pen and paper version of the Matrix, the software version of Matrix of Change contains significant features underlying the main screen. In particular, the software tool helps the user to associate other information with the items and entries in a Matrix of Change.

For example, one can create discussion forums around the current business practices, the target business practices, and the entries of the matrices. This helps foster communication about change. The
tool's links to underlying information also help document both the rationale for the changes and the assessments about interactions between practices.

Another useful feature of the tool, that is hard to replicate with pen and paper, is the ability to organize and re-order the list of items. Often, during brainstorming sessions, people will create lists of existing and target practices in a disorganized order that reflects the flow of free association and the order in which different people with different perspective contribute to the process. Later, these people might notice that the list should be regrouped by categorizing the items or by prioritizing the items. Whereas reorganizing a paper-based Matrix of Change would be time-consuming, the Matrix of Change software makes reorganizing easy.

B.2. Why Change is Difficult

Everyone knows that change is very difficult, but few understand why. Some cynically attribute resistance to change to closed-mindedness, risk averseness and a general inability to teach old dogs new tricks. But Prof. Brynjolfsson's work illustrates a powerful reason why change is hard, at least in the short-term.

Using the Matrix of Change, one can examine how the existing practices of an organization interact with each other -- how they complement or conflict with each other. Prof. Brynjolfsson has found that most organizations consist of mutually complementary networks of practices. The practices of the organization are tightly coupled and coherent (many "+") in the vertical half-matrix associated with the current business practices). Changes, in the form of different practices, models, and strategies are often incompatible with the existing set of business practices. Changing to a different, future set of mutually reinforcing, coherent business practices can involve much destruction and pain -- a veritable valley of death.

Difficult Transitions

Work with the Matrix of Change illustrates why the transition from an existing set of practices to target future set of practices is often extremely painful and disruptive. Typically, the existing practices are mutually reinforcing (many "+" signs in the left-lower triangular half-matrix). And, also, the target practices should be mutually reinforcing (many "+" signs in the upper triangular half-matrix). But if the square transition matrix contains numerous "-" signs and few "+" signs, then it indicates gross incompatibility between the existing and target practices. The more negatives in the transition matrix, the harder the transition.

The Matrix of Change can help companies both to predict the magnitude of conflict and to understand the sources of conflict. Understanding which particular existing practices conflict with which particular target future practices helps the company to focus change management resources on the areas where change will be the hardest.
Substandard Outcomes: Non-Complementary Targets

Even if companies can push past the transition, the outcome on the other side may not be as good as expected. Prof. Brynjolfsson cautioned that some companies fall prey to the "best practice buzzword" approach to management in which the herd mentality draws senior executives to try to adopt the latest business practices. Besides the major issue of incompatibility with the business' current practices, these buzzword best practices may be incompatible with each other. For example, decentralized practices such as empowerment can be at odds with centralized practices such as IT standards.

The Matrix of Change helps organizations see if a proposed collection of target practices is actually complementary -- sometimes two rights make a wrong. Organizations need to understand how a proposed new "good" idea fits into the context of their own organization.

Change Fatigue: Another "Fine" Program

Another of the contributing factors to change resistance is change fatigue. BT referred to this as the AFP (Another 'Fine' Program) effect. Too often, corporate centers and senior management create well-intentioned programs in an attempt to implement new business strategies, improve productivity or performance, reduce costs or errors, boost shareholder value, or rejuvenate the organization. For example, BT showed a slide of the large number of corporate programs in recent years, ranging from TQM to BT's global joint ventures.

BT referred to so-called "balloons and mugs" tactics that try to rally the troops and drive adoption of yet another fine set of business practices. But as the message filters down through middle management, the effort becomes diluted, garbled, and lost. Meanwhile, lower echelon managers and the bulk of the employees know that they still have a job to do and that the current change program du jour will have little lasting impact on the organization. The result is a cynicism about each new program based on the reality that each new program is just a transitory blip in the organization's history. Employees simply become tired and apathetic under the onslaught of too many "fine" programs.

Caught in the Middle of Change

Curiously, middle management may be the most change-resistant group in many companies. For example, Merrill Lynch mentioned that branch managers were most resistant to Merrill Lynch's changes in commission/fee structure. Merrill's frontline people wanted the change to respond to the competition and Merrill's senior management wanted the change to improve shareholder value. Middle managers are often too far from the front line to see the day-to-day problems of current business practices. Nor do middle managers see the strategic big picture as seen by the senior management. Moreover, because middle managers are often in the middle of their careers, they tend to be more risk averse than the young turks on the frontlines. Thus, middle managers have strong incentives to play by the existing rulebook and to avoid changes to that rulebook.

Tacit Assumptions and Hidden Practices

Even change-happy dot-com companies found that real change is hard. Many of the dot-com companies espoused hyper-dynamic business strategies -- they saw themselves as nimble companies
that could operate on internet-time. Yet these dot-coms tacitly assumed that the gravy train of investor dollars would continue until the company reached some distant goal of critical mass. Such companies were unprepared for the massive change in investor sentiment in 2000 -- the change from "valuation of future growth" to "valuation of near-term profitability". Prof. Brynjolfsson cautioned that the Matrix of Change only helps organizations to understand the interactions among what is explicitly documented. Organizations need to uncover the tacit assumptions and deeply ingrained, undocumented business practices that lurk within their organizations.

**Change is more than Changing Technology**

In e-business, many changes have a major technological component -- installing a piece of enterprise software or new corporate information architecture to support e-business. But the success rate of these large IT projects (in terms of the percentage that achieve the anticipated benefits) is often low. Many blame the technology, but a large-scale study by Prof. Brynjolfsson illustrates that investing in IT is insufficient.

This survey and analysis of 753 large firms shows that firms only gain the benefits of new technology when they make substantive investments in organizational capital (in the form of training, business process engineering, and new management practices). Indeed, the work suggests that each dollar invested in technology needs approximately $10 in investment in the organization. Firms that invested too little in either technology or the organization had lower market capitalization and did not see the same productivity gains as firms that invest in both IT and the organization.

i2 echoed this issue based on their extensive experience with delivering enterprise software. Too often the new software works, but the new business system does not. i2 pointed to a lack of top management support and inadequate change management resources as leading causes for the failure of enterprise IT projects. Change is hard when the investment in the change is incomplete, inadequate, or unbalanced. Implementing e-business requires investments in the organization, not just investments in e-business software and hardware.

**B.3. The Spectrum of Change**

Change takes many forms, and the nature of a change affects how organizations should think about and manage change. That so many projects run over budget, miss deadlines, and often fail is the surest proof that planning is imperfect. This systematic inability to predict the cost, duration, and success of change efforts suggest that traditional models of change contain deep, systematic flaws.

**Is Change Discrete or Continuous?**

Prof. Orlikowski argued that change is continuous and has a substantive, unforeseeable impact on organizations. By contrast, the traditional model for change assumes both a discrete transition from the existing state to the goal state and the ability to foresee the outcomes of the change effort. But Prof. Orlikowski argues that change is never so simple as the discrete models of change would have one believe.
For example, although the Merrill Lynch case is presented as if Merrill Lynch made a single shift from its traditional revenue model (high-commission per trade) to the new model (modest-percentage-fee for unlimited service), the reality was different. Instead of a single switch from new to old, Merrill Lynch implemented several interim initiatives, include low-commission online brokerage, and some initiatives took longer than others. Real change involves staggered events, non-instantaneous rollouts, and continuous adjustment of change efforts. Nobody believes that a given strategy, structure, or piece of software will last in perpetuity.

But the impact of believing that change is discrete and controllable leads companies to emphasize upfront planning to manage change. In doing so, the companies believe that they are reducing risk. But when unforeseen (and unforeseeable) consequences or additional changes appear, the original plan becomes obsolete or sub optimal. Companies need to spend more resources on dealing with the back-end consequences of change, rather than in designing the perfect plan.

Cisco exemplifies the use of continual change as a means of pursuing growth in a very dynamic marketplace. Whereas many companies emphasize big IT projects with multi-year timelines and 500-page GANTT charts, Cisco goes for quick projects and quick wins. Cisco IT projects have a mandated length of 9 months or less. Individual business units generally fund these projects -- what Cisco calls its "client funded model" for IT. Cisco argues that smaller, shorter projects have faster time-to-benefit and are easily to control when situations change. The client funded model also implies local control -- business unit managers have control and responsibility for creating measurable business benefits from their group's IT investments. This is not to say that Cisco contains a patchwork of incompatible IT systems -- the core infrastructure is highly standardized at Cisco.

**Planned vs. Improvisational Change**

Prof. Orlikowski described how the Sloan MBA program encouraged an emergent change when newly admitted students tried to form their own online community. As a student-led online community (hosted outside of MIT's control), the community had the potential to both help MIT (by helping new prospective students to meet each other) or hurt MIT (by discussing unfavorable issues or discouraging the new students from actually attending MIT). The staff of the Sloan School decided that this independent online community had a potential net positive impact on helping admitted students to decide to actually attend MIT (vs. another school that might have accepted them). MIT implemented opportunistic changes by both linking to the outside student-lead community and by highlighting the existence of the community to all prospective admitted Sloan students. The point is that the Sloan staff did not "plan" to create a student-led online community, but once it occurred, the staff made changes to leverage the work of the student to further the goals of MIT.

**Change Begets Change**

Several companies highlighted the unavoidable reality of change, especially how changes by other companies and in the economy at large lead to the need for change. The case of Merrill Lynch and its innovative response to the rise of online brokers proves the unavoidability of change. Another example is the U.S. Postal Service, which anticipates a long-term shift from physical media (e.g., paper letters and advertising) to virtual media (e-mail and web). The USPS wants to remain in the loop, parlaying its
assets for daily delivery and its connection to every domestic address into sustained financial performance. The Internet creates inevitable but interesting impacts on organizations such as USPS -- e-mail replaces traditional first-class mail, but e-fulfillment increases the volume of packages. Other companies, such as Cisco and Nortel, are working to adjust to the rapid drop in demand in the high-tech economy.

**Destiny vs. Destination**

The point is that companies may control their destiny, but not their destination. Changes in the marketplace, changes in customers, changes in technology, changes made by competitors, and even changes made by the company itself all impact a company in unforeseen ways. These are all examples of what Prof. Orlikowski called unplanned changes.

The key to actual success is to avoid a dogmatic and rigid execution of a long-term plan in the face of unanticipated change. Prof. Orlikowski argues that companies need reserves of resources to exploit unplanned changed -- creating opportunistic changes that improve the company's destiny even as they change the company's destination.

**Matrix of Change vs. the Improvisational Change Model**

During the breakout sessions, the participants used both the Matrix of Change and Improvisational Change methods to consider the change efforts of a selected company. The participants' experiences highlighted the biggest difference between the two models -- the Matrix of Change is an analytic tool suited to preplanning with known business issues while the improvisational change model highlights the need for reactive/adaptive response to unplanned and ongoing changes. As such, the improvisational model is not something that an organization would use prior to a planned change, except to realize that the organization should reserve a fraction of its change resources for dealing with unplanned change. But, this difference does not mean that Matrix of Change and the Improvisational Change model are mutually exclusive.

**Using the Matrix to Support Improvisational Change**

For those with an analytic mindset, how should an organization rationally pursue improvisational change? Responding to an unplanned change is challenging and presents the organization with three alternatives:

* aggressively suppress the emergent change
* passively ignore the emergent change
* actively exploit the emergent change

The improvisational change model suggests that organizations should make opportunistic changes to deal with emergent changes, rather than dogmatically pursuing their best-laid plans. Although the Matrix of Change was posed as an alternative to the improvisational change model, one can actually use the Matrix of Change in support of optimizing improvisational change. The key is to add any emergent changes to the target set of practices (in the upper Matrix list) and look at all the new interactions.
First, organizations should look at how the emergent change interacts with the proposed planned changes (the target set of practices). If an emergent change is mutually compatible with the planned target set of changes, then the organization should actively encourage the emergent change. If an emergent change conflicts with the planned target set of changes, then the organization should either actively suppress the emergent change or consider further changes to the target change to keep the organization in sync with an emerging reality. If the emergent change is neither complementary or conflicted with the target planned changes, then the organization can safely ignore the emergent change.

Second, organizations should examine how the emergent change interacts with the existing set of practices (assuming that they are only partway through a major change effort). If the emergent change is in conflict with the existing set of practices, then the organization may need to accelerate its planned change effort. If the emergent change strongly complements the existing set of practices, then the organization might slow the change process or partially retain the old set of practices (depending on the interactions between the existing and target set of practices). The Matrix of Change can be used to understand how an emergent change interacts with existing and target practices and to modify change efforts appropriately.

Positive vs. Negative Change

Cisco brought up an important point about the difference between positive change (e.g., change to enact a brighter future in a growing company) and negative change (e.g., change to cope with an economic downturn). Prof. Short referred to this as *change as an opportunity* vs. *change as a necessity*. Rallying the troops in good times is easy; enacting cutbacks is hard. Cisco believes that the key to handling both types of change lies in adhering to the culture of the organization. BT also felt that the nature of leadership is different during times of instability than it is during more stable business periods.

Big-Bang Change vs. Go-Slow Change

Another potentially contentious dichotomy for change management relates to the pace of change. Sometimes, companies favor a "go-slow" approach to change on the theory that caution equals lowered risk. Yet, if the target practices deeply conflict with the existing practices, then a slow transition will be especially painful. For example, Prof. Brynjolfsson related to the experiences of his parents in Sweden when Sweden switched from driving on the left side of the road (as in Britain) to driving on the right side of the road (as in the U.S.) Thankfully, Sweden did not chose a gradual approach -- they opted to switch sides at exactly 2 a.m. on a particular night (of course, the emergent effect of this policy was that everyone stayed up late that night to participate in the switch!) If the target practices are conflicted with the existing practices, then there are very good reasons to accelerate and coordinate a major change effort.

On the one hand, if the Matrix of Change indicates that the target practices conflict with the current practices, then the organization may find that a slow transition period will prolong the pain. One participant also mentioned that slow approaches to change can also increase resistance by allowing change resistors to marshal their arguments for preventing the change. On the other hand, if the Matrix of Change indicates that the new practices are compatible with the current practices, then a gradual approach can work. Indeed, a gradual approach can give the organization time to cope with emergent
changes arising from slowly-implemented changes. As the change process progresses, the organization can use the Matrix of Change to support organizational change.

### B.4. How to Change: Communicating Change

Communication is a crucial, but challenging, element of change management. Both the presenters and the audience members reflected on the need for communication in change processes and the potential for the Matrix of Change to aid communications about change. Cisco, especially, stressed the importance of communication in informing employees of forthcoming changes -- reticence breeds resistance and resentment. Cisco uses video on demand to drive information to everyone. Internal websites ensure that there are consistent answers to questions.

#### Different People, Different Matrix of Change Answers

Because organizations are such complex entities, no single person can have the entire picture. Rather, different people will have different insights about change. For example, the sales force might be painfully aware of how a given business practice creates serious problems for customers. Or, senior management might see how current business practices stymie long-term strategic goals. Local incentives and local performance metrics also motivate particular people to have particular perspectives about change. For example, the shipping department, with incentives to hold down shipping costs, might have special insight into the shipping costs of a proposed e-business strategy.

The Matrix of Change can foster a more complex understanding of all these perspectives. Whether on paper or via the software tool, different members of the organization can comment on how they believe a given business practice interacts with other business practices. The software tool can be especially powerful for cross-organization communication and discussion of change because it supports links to online discussion forums. BT referred to the Matrix of Change as an "Adult-level" communications tool.

#### Balancing Power and Ease-of-Use

In the break-out sessions, the participants were struck by how quickly they could fill in a Matrix of Change of a given business scenario. The simple +/-/blank/- interaction codes capture the salient impact of one business practice on each other business practice. More importantly, the assignment of +/- codes guides the conversation -- helping people to understand how the pieces of a business fit together. Although business is much more complex than any one-page Matrix of Change, to create a more complex tool that forces people to document the full complexity of a business situation would do more harm than good. Complex tools are hard to learn and hard to use, and thus they do not get used. The Matrix of Change creates a very useful tool that balances the requirement for ease-of-use against the desire for power.

#### Ad Hoc vs. Matrix of Change

The point is that the alternative to a tool such as the Matrix of Change is usually ad hoc discussions (or no discussions) of how a proposed change impacts the existing organization. The Matrix of Change is easy to use, but it is very powerful because it enforces a disciplined review of the impact of a change.
The Matrix helps organizations to systematically look at the dozens or hundreds of interactions between sets of existing and proposed business processes. Whereas it might be hard to hold all these interaction factors in one's head, it is easy to see the preponderance or "+" or "-" signs in the interaction matrices. Without the Matrix of Change, it is easy to be swept up by the buzzwords of another fine program or the vociferous arguments of the proponents of a change -- implementing a new practice because it is all the rage in BusinessWeek or because the CEO's golf buddies use the practice in their companies.

Facilitating Communication with the Matrix of Change

The first step to creating change is to create a vocabulary of change -- what are the proposed target practices are and what do these practices entail. Buzzwords and acronyms do not count, people must understand the meaning behind the jargon. The Matrix of Change can help create a vocabulary for change by explicitly defining the set of current and proposed practices and by surfacing the interactions between all these practices. Although the Matrix of Change tool supports online discussions, BT cautioned that discussions about change should start with a face-to-face component first. Once everyone is familiar and in same space, then they can use remote tools effectively.

B.5. How to Change: Leveraging Assets to Create Change

Many believe that change is destructive -- out with the old and in with the new. But some of the most powerful changes leverage existing assets by modifying their use or role in the company. Although creative destruction plays a major role in changing organizations and economies, companies can use creative construction to respond to external change with a minimum of disruptive internal change.

Merrill Lynch: A Strength Becomes a Weakness Becomes a Strength

Clever companies can change by modifying their existing assets in ways that radically change their business model without destroying their base of assets. For example, Merrill Lynch had a well-developed, and expensive, base of assets in the form of its research staff and network of 17,000 financial advisors (brokers). When low-commission online brokers arose, many thought that Merrill Lynch would be forced to cut their high-paid staff and follow the Schwabs and E-Trades of the world. Without high commissions on every trade (and what customer wants to pay a high price), Merrill Lynch could not pay the salaries of its brokers and analysts. And the threat was real. Schwab's market capitalization came to exceed that of Merrill Lynch, and Merrill became aware that some its customers were listening to Merrill's financial advice but then taking their trading business to online brokers.

Instead of destroying its traditional strength, which had turned into a liability, Merrill radically changed its business model. Merrill went from a transaction-oriented (commission-per-trade) revenue model to a percentage-fee, asset-management model. This enabled Merrill to preserve and leverage its traditional asset base of analysts and brokers while reducing customer's incentives to defect to low-cost online brokers. Merrill's "Unlimited Advantage" account offers free online trading, sound financial advice, and access to top-notch research in exchange for a modest fee. Indeed, the new fee structure (which is a percentage of the customer's assets) increases the alignment of incentives for brokers and customers.
alike. Now, brokers have less incentive to "churn" customer's accounts' and customers have less incentive to steal Merrill's advice and trade elsewhere.

**Leveraging Others' Assets: UPS on the Internet**

Companies can also leverage the assets of others to affect change for modest cost. For example, UPS dramatically expanded their package tracking services, while reducing the cost of servicing package tracking requests. The key was to leverage other people's assets. In the past, UPS used toll-free numbers and massive call centers to support package tracking requests. UPS paid for the long-distance phone call, paid for a person to answer the phone, paid for a person to type the request into a computer, paid for the desktop computer terminal, and paid to have the person read off the results of the query. But, with the advent of the internet, UPS leverages the customer's desktop PC, the customer's modem/hookup to the internet, and the public internet. The only investment and cost for UPS is the web server that connects to the internet and to UPS' back-office systems. By leveraging the assets of others, UPS can offer package tracking on even its low-cost ground shipments.

**Borrowing from External Sources**

Every day, businesses around the world create new and innovative business strategies, business models, and business practices. In some cases, these business innovations become the basis for increasing growth, competitive advantage, and even radical transformations of entire industries. For example, the rise of low-cost, low-commission online customer self-service changed the retail brokerage industry. Many companies, wisely, look to reap the benefits of other business' developed innovations -- they borrow best practices from external sources. But, is every external best practice suitable for internal use?

**Obstacles to Borrowing Best Practices**

How should companies evaluate the best practices of other external companies prior to implementing them for internal use? Prof. Brynjolfsson cautioned that each business tends to self-optimize into a highly coherent, tightly coupled network of practices, models, and strategies. Borrowing a single best practice from another organization can create problems for two reasons. First, the borrowed best practice may be incompatible with the borrower's existing network of practices. Second, the borrowed best practice may not work in isolation from the network of other supporting practices at the firm from which the practice was borrowed. Prof. Brynjolfsson said that business practices are NOT good or bad in isolation -- the value of a practice is context sensitive. Companies with square holes should not borrow round pegs, no matter how well the pegs perform in other companies or other situations.

**No Excuse for "Not Invented Here" Syndrome**

Yet the potential problems of borrowing best practices are not a defense of the "Not Invented Here" syndrome. Rather, companies need tools, such as the Matrix of Change, to examine the interactions of business practices. With such tools, they can then determine how a borrowed best practice might interact with existing business practices. The Matrix of Change can help companies examine candidate best practices from other sources to determine the compatibility of the candidates both with existing
practices and with each other. The Matrix of Change helps companies understand the context sensitivity of business practices.

**B.6. Change for Customers**

A number of the sponsor companies discussed the issue of supporting change in customers -- helping customers to change or to understand how changes affect customers. These examples ranged from consulting companies to consumer packaged goods companies. Each industry has a different interest in how change affects its customers and how the company might profit from customers' changes.

**Consulting Companies: In the Business of Supporting Customers' Change Efforts**

Consulting companies (such as GEA and CSK) are obvious examples of companies that must help support change in their customer companies. Client businesses pay consulting companies to create and drive change in the client businesses. Thus, it is natural that consulting companies would adopt change management methodologies and tools. Tools, such as the Matrix of Change, would go into the consultant's toolbox for use on client engagements.

**Technology Vendors Help Customers Manage Change**

Enterprise software implementation projects are also heavy users of change management tools. Implementing a major technology initiative implies implementing a major change initiative. New software means new business practices, training employees, and changing how the business is managed. Indeed, Prof. Brynjolfsson described how companies that successfully invest in technology actually do so by also investing in the organization. Creating a high ROI for a technology investment implies also investing in training, new business processes, and new management practices. He suggests that each dollar invested in technology needs as many as 10 dollars of investment in the non-technological side of the organization.

The point is that the purveyors of enterprise technology (such as i2 and Cisco) have a vested interest in helping their customers to successfully implement technology projects. i2 is especially interested in helping companies implement the changes which coincide with implementing i2's enterprise software. i2 is moving to a revenue model in which the price paid by the customer is a function of the benefits received by the customer. Obviously, if the customer botches its change effort, then the customer sees fewer benefits, and i2 will be paid less. But even those technology vendors that do not have i2's unusual gain-sharing model will want to ensure that customers successfully implement the vendor's technology.

**Fostering Change in the Supply Chain**

Even non-consultants and non-software companies can benefit from guiding or supporting customer's changes. For example, many traditional companies are trying to change their supply chains, thereby improving their connections to their customers (and suppliers) to the mutual benefit of all. But it takes two to change the supply chain -- both the supplier and the customer must make coordinated changes to jointly adopt a new supply chain practice. Yet, some companies face a real battle in convincing the customer to adopt, say, new order processes or new inventory practices. For example, Mitsui, a
Japanese trading company, mentioned the challenge of bringing more e-business practices to global trading operations. Manufacturing and distribution companies can use change management practices to help drive adoption of new supply chain practices.

**Understanding Customers’ Long-Term Change Plans**

Change tools can even support much longer-term customer-related goals. For example, BT has successfully used the Matrix of Change with its business customers. For BT, the value proposition of this practice is twofold. First, the deep and wide-ranging discussions help BT to build a better relationship with the customer. By discussing the customer's broader business issues (not just near-term telecom needs), BT strengthens its understanding of the customer and builds a strong bond to the customer. Second, the practice yields insight into the long-term changes at customer businesses that will eventually impact the customer's telecom and data service needs. Insight into customer's future telecom needs helps BT focus product and service development in the right direction.

Finally, companies also want to understand how changes impact consumers. Companies as a diverse as Unilever and Fleet want to understand changing consumer tastes and how technological change leads to changes in consumer products and services. Changing demographics, changing lifestyles, and the uncertain pace of technology adoption all imply the need for change for consumer-facing organizations.

**B.7. Impact of Change: Second-Mover Advantage?**

Several representatives of non-American firms mentioned the lag in adopting e-business in Europe and Japan. Businesses in these counties face the interesting position of both playing catch-up to U.S. counterparts and avoiding the mistakes associated with the largely U.S.-focused rise and fall of the dot-com phenomenon. On the one hand, these companies appreciate the value proposition of e-business (new business models, new ways of connecting to customers and to suppliers, and new opportunities for cost reduction). On the other hand, the fall of the dot-coms makes foreign companies wonder how much truth lies within the hype surrounding e-business.

**Second Movers Leverage Emergent Change**

Second movers have an advantage in coping with emergent changes arising from first-mover activities and a dynamically evolving marketplace. According to Prof. Orlikowski, emergent change arises from the unexpected side-effects of planned change. While first movers are still trying to follow their pioneering plans, second movers can leverage the experience of first movers. The land-grab for domain names, eyeballs, and wireless licenses are now giving way to buyer's remorse. Some first movers will find that they have tarnished brand names and failing cash reserves. Second movers, by contrast, have an interesting opportunity to buy out distressed first-movers and to avoid some of the irrational exuberance of the dot-com boom.

**Ultimate Movement to E-Business**

The question is, will excessive pessimism about e-business tarnish the opportunities for all players in the market? Prof. Brynjolfsson argued that e-business will have a major beneficial impact on business and
the world. The potential gains from e-business are real, but that it will take longer than many people realize. Prof. Brynjolfsson pointed out that electricity, the major innovation of hundred years ago, made a major improvement difference in factory productivity. But it took more than 20 years for businesses to redesign their factories to leverage the opportunity latent in electrification. So too, businesses will only reap the full benefits of e-business when they redesign all aspects of their business to leverage the opportunity latent in e-business. Prof. Brynjolfsson is hopeful that this will not take 20 years, given companies’ participation in events like today’s workshop in which they learn how to make effective transformational change.