CIO Summit

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I. Presentation Summaries

1.1. Your Car as You Would Build It -- Trust Me

Vince Barabba, VP of Strategy, GM

GM created an online trust-based advisor that helps consumers find the car that is right for them. The philosophy behind the advisor is similar to the philosophy shown in the movie *Miracle on 34th Street*, in which a Macy's Santa tells shoppers to go to arch-rival Gimble's when Macy's doesn't have the items they want. Macy's management is initially horrified, but then gains business because customers trust Macy's honesty. Similarly, GM's online advisor provides information not only on GM cars but on competitor's cars as well. The goal is to help the customer buy the car best for them, whether it is a GM car or not.

The natural question is, why would GM want to help consumers potentially buy non-GM cars? The answer is that GM wants to build customer relationships. If customers want features and options which GM cars do not have, then GM can at least determine these preferences and feed that information back to its design engineers quickly. Furthermore, GM's research determined that many people are not aware of the improved quality ratings which GM has achieved over the past 10 years. Thus, they may not be including GM cars in their decision-set due to outdated perceptions.

How Auto Choice Advisor Works

Auto Choice Advisor is designed for people who are shopping for a new car but are not sure which makes and models might suit their needs. At the site, potential car buyers answer a few questions, such as how they plan to use the car, what features they want, how much they are willing to spend, etc. Based on their answers, GM shows them the top 5 choices matching their needs (from 150 makes and models available from all manufacturers). GM cars do not show up unless they meet the consumer's criteria. There is a button, however, which consumers can click to view the closest GM match if they choose.

Unbiased Information + Privacy = Trust

GM's Auto Choice Advisor can be accessed not only through GM but also through the Kelley Blue Book site. To ensure unbiased data, the measurable characteristics data comes from IAC, an independent company, not from the car manufacturers themselves. Information on quality comes from J.D. Power Company. Privacy is guaranteed. Indeed, no persistent cookies are used and customers do not need to register at the site. These practices ensure strict privacy.

GM has been working with Prof. Glen Urban of MIT since 1990 on the concepts that underlie the online advisor. In the 1990s, GM tested TruckTown, a software-enabled advisor based on Prof. Urban's research on trust-building practices. Research showed that 75% of TruckTown users trusted the virtual advisor more than they trusted other channels.
Advisor Benefits

The main benefit of the site to GM is that it builds two-way communication with the consumer, letting GM gather real-time data on consumer preferences while educating them about their options. The principles behind the online advisor are similar to the principles outlined by GM's director of market research in 1932, Buck Weaver -- that a million opinions make a fact. Back in the early part of the century, GM routinely mailed opinion poll questionnaires to gauge the public's interest in such things as streamlining, the location of the spare tire, and the configuration of the trunk.

To date, 100,000 customers have used GM's Auto Choice Advisor, and 80% say they would recommend it to a friend. Access to this real-time data lets GM identify unmet needs, such as if SUV customers want small turning radiiuses. Also, because consumers indicate how much they are willing to spend to have these options, GM can determine the reward of inventing a solution for a given option. Previously, GM engineers only had cost data: they had no way to predict the potential revenue to be gained from one design compared to another.

1.2. Business Transformation: Organizational Capital and Culture

Short presentations and roundtable discussions explored the role of corporate culture and organizational practices in leveraging enterprise IT investments.

Erik Brynjolfsson, Schussel Professor of Management, MIT

Prof. Brynjolfsson presented new research from his study of the productivity benefits of IT investment and whether companies that use the internet do business differently than other companies. Specifically, Prof. Brynjolfsson has found that although companies who invest in IT receive productivity benefits, some firms receive much higher benefits that others. The companies who gain these disproportionately high benefits, Prof. Brynjolfsson has found, are companies who have created a distinct corporate culture -- a "digital organization." Specifically, these companies tend to use a set of seven business practices:

1) A policy of open information access and communication
2) Distributed decision rights and empowerment of line workers
3) Strong performance-linked incentives
4) Active investment in corporate culture
5) Regular communication of strategic goals throughout the organization
6) An emphasis on recruiting and hiring top employees
7) Heavy investment in training, including online training

These practices are internally coherent and mutually reinforce each other. For example, open information access is complementary with decision rights to act on that information. Firms which adopt these practices are significantly more productive than their competitors.
Brad Boston, CIO, Cisco

Cisco Systems has gained benefits totaling $1.7 billion dollars by adopting digital organization business practices. As Brad Boston pointed out, the Cisco culture is focused on using the Internet to speed business and cut costs across all areas of the company, from customer service to supply chain management to e-learning. The digital organization culture starts from CEO John Chambers, who encourages a self-service orientation, self-reliant employees, teamwork and networked communication. Cisco treats IT as a strategic investment and has not cut the IT budget despite the recent economic downturn.

Roundtable Discussion

Prof Michael Scott Morton moderated a discussion among the CIOs about how companies can get smarter in the increasingly dynamic world of business.

Joseph Plummer, CIO, McCann-Erickson WorldGroup, stressed the importance of marketing the value of IT and knowledge-sharing inside the organization. The key is for IT practices to impact the core competencies of the company. That means making tools easy to use and navigate. For example, intranets that provide access to best practices, consumer insights and market research drive the creativity of a company like McCann-Erickson. McCann-Erickson uses IT to drive ideas.

Kenneth Cooke, Partner, PricewaterhouseCoopers, described how his company uses technology to be more productive. Specifically, PwC created IdeaSource to harvest ideas from its 170,000 employees worldwide. The goal is to digitize knowledge and re-use it within the company. A question for the future is whether PwC's clients will want to interact with PwC digitally as well, submitting questions electronically. PwC has been experimenting with this model, which is a radical departure from its traditional relationship with clients.

Roundtable discussion centered on demonstrating the correlation between IT investment and business return. Some companies were frustrated that much of their IT budget is absorbed by maintenance of legacy systems rather than new value-added projects. Other companies are documenting results only as an afterthought. The most successful companies are piloting new tools and showing the savings which those tools have brought. The US Postal Service pointed out that one can use IT to gather the data that shows the value of IT. While CIOs felt pressure to justify the business value of IT expenditures, Intel noted that that all "C-level" executive face demands for demonstrating a contribution to business performance.

1.3. The New Role of the CIO

Peter Weill, Senior Research Scientist, Director, CISR

Dr. Weill put forth the provocative statement that a CIO's most important role is to set the IT governance structure. Effective governance structures let the CIO accomplish more than the bandwidth of personal leadership alone would allow. Companies who lead on productivity measures have governance structures that address decision rights, state who is accountable for what, and who has input
on which decisions. Dr. Weill used the case study of banking firm State Street Corporation, which uses the governance structure to support strategy. State Street identified the IT governance mechanisms and style that support the company's business objectives. It also identified the metrics which IT can use to measure its impact on business performance goals. For example, the IT metric assessing "re-used technologies" impacts the business goal of cost efficiencies.

**Douglas Busch, CIO, Intel**

Intel's CIO uses a "lead and govern" approach. IT at Intel is a group of activities and capabilities supported by and centralized under the CIO. The role of the CIO as an individual is to be a "T-shaped" executive. That is, the CIO must have some knowledge of all the functional areas (manufacturing, marketing, legal, HR) but have deep expertise in IT. The CIO is responsible for all execution and reliability of IT within Intel. To demonstrate the impact which IT has on the company, Intel's IT group publishes an IT annual performance report (like a company's annual report to shareholders) that describes the scope of IT at Intel and its performance results in enabling core business processes, manufacturing design engineering, productivity and communication.

**Roundtable Discussion**

John Rockart, Senior Lecturer at MIT, moderated the discussion on the internal and external roles of the CIO.

Richard Ricks, CIO, Nortel Networks said that the CIO needs to understand business and shape strategy not just for IT but for the business as a whole. The CIO must interact with customers, suppliers, and employees, creating a productive environment for all. Although the CIO works with teams, he cannot delegate the IT ROI payoff. The CIO is accountable for IT projects getting a good return on investment. In some cases, that may mean starting with a smaller IT project in order to see the ROI faster. The CIO also takes responsibility for setting standards, because without standards, agility would be negatively impacted.

Charles Bravo, CTO, US Postal Service has a CIO who reports to him. The CIO is responsible for infrastructure, whereas Mr. Bravo is responsible for strategy. The US Postal Service is a governmental entity, not an agency. It generates revenue and has a break-even mandate. The IT group supports lines of business, with IT portfolio managers assigned to each business and working as a team with the business to justify IT investments. Projects are approved only if they align with business objectives. The CTO sets standards for IT investments and lays out the architecture and toolsets to be used.

Roundtable discussion centered on the roles which CIOs have at their organizations. For example, at the USPS the CIO reports to the CTO, whereas at HP the roles are reversed. At HP, the CIO's role is to align business interests with IT investments, set governance and work with lines of business to set business direction. In contrast, the CTO's role is to lead technology, select tools, define architecture and ensure technology quality. Like John Chambers, HP's CEO Carly Fiorina sees IT as a core investment and a priority. At EQUANT/France Telecom, the CIO's role was to create a governance model that would apply to the merged company. The CIO's role is about leadership, ownership and customer orientation. At Intel, the CTO is positioned in product technology and manufacturing technology.
1.4. The Semantic Web and the Future of Networked Business

Tim Berners-Lee, Inventor of the World Wide Web and Director of the 3W Consortium

Tim Berners-Lee began his presentation with the original slide he had used when presenting the concept of the World Wide Web to executives at CERN. His goal with the web was to enable people to access data and to talk to one another. That vision has worked, but now the challenge is that while humans can read and understand web pages, computers can not. As a result, people are stuck doing unnecessary tasks such as typing information from the web onto their PDA or manually tracking down who wrote a page when. On the corporate level, companies spend millions to create middleware or translators to get data from one application or database to another. These types of activities could -- and should -- be done by machines. (As Dan Connolly, author of *The XML Revolution* said, "The bane of my existence is doing things that I know the computer could do for me.")

Tim Berners-Lee's current project, as part of the World Wide Web Consortium (www.3W.org) is called the "Semantic Web." The Semantic Web uses RDF language that documents the relationships between objects. Objects have meaning and the relationships between the objects (semantic links) have meaning as well. By documenting the meaning of data and the links between data, applications can merge or interconnect disparate data from other applications. In this environment, software agents will be able to understand relationships between objects (such as that Dr. Jones works at the dental clinic on Mondays) and therefore be able to carry out tasks such as scheduling a dental appointment on behalf of their users.

Danger: Patents

The biggest roadblock to implementation of the Semantic Web would be companies who try to patent technologies used on the web. Patents destroy open interoperable standards. If companies announce the intention to patent a web standard technology, other companies will not deploy it and fragmentation will result. Indeed, one reason why the World Wide Web has become so pervasive is because Tim Berners-Lee did not try to patent it. He strenuously lobbied CERN and others to keep the web royalty-free. For the Semantic Web to reach ubiquity as the World Wide Web has, web standards must be kept royalty-free.

Relationship to Other Standards

During the question and answer period, an audience member asked about the relationship of RDF to other standards for exchanging data, such as the HL7 standard which the medical community is creating. Creating these standards requires that the data be well-modeled and have good semantics. In essence, Tim Berners-Lee said, the hard work has been done, and all that is needed is to convert HL7 to RDF, which means writing an RDF schema to turn HL7 to RDF. The advantage would be that, instead of only the medical community using HL7, once the data is in RDF, it can be used by other communities. In addition, many communities need to encode data such as the age of a person or that person's height. RDF replaces the need for each community to create its own standards for encoding this basic type of information.
The advantage which RDF brings that XML does not is the opportunity for re-use. One key to the proposed Semantic Web standards is that they do not define rigid meanings or define some universal terminology. For example, the catalog division of a company might create a tag called "Zip" to refer to the Zip Codes of customers, while the retail chain side of the company uses the tag "MailCode" for the zip codes of local retail outlets. With the semantic web, a third group, (getting data from the first two groups) could recognize that the terms are synonymous and link the data to understand which stores are near which customers. Documenting the meaning of the tags and relationships lets computers uncover data that means the same thing even if the tags are different.

**Trust**

Another question raised was the issue of trust, such as trusting that information is still valid and accurate given the dynamic web environment. Tim Berners-Lee explained that this problem would be solved by all published information having an expiration data associated with it. This would keep track of the temporal aspects of trust. In terms of security, a user could ask for pages to be time-stamped and notarized that the web page said what it said on a specific date. In terms of broader trust issues, all information on the web occurs in some context. Applications need to understand this context in order to evaluate the trustworthiness of the statements. The machinery of the Semantic Web does not assert that all statements found on the Web are "true." Rather, trustworthiness is evaluated by each application. What the Semantic Web does bring is a very flexible, powerful language to convey the complexity often associated with trust models.

**Accelerating the Semantic Web**

Overall, Tim Berners-Lee sees the various activity around standards taking place as helpful to accelerating the Semantic Web. As he pointed out, to double the size of the community working on setting a standard would not double the speed, because large communities cannot move in lock-step. Instead, separate activities allow for faster movement initially. After those standards for data modeling are defined, a schema can be written to translate the standard into RDF.

**1.5. Making eBusiness Pay Off: The Three Most Effective Uses of the Internet in My Firm Today and in Five Years**

During three short presentations and a roundtable discussion, the CIOs discussed current successes and future plans.

**Vincent Kelly, CIO, EQUANT/France Telecom**

At EQUANT/France Telecom, the Internet is an integral way of going business. The Internet is pervasive, invisible, "business as usual" now. Staff across all departments use the net to gain access to information. EQUANT/France Telecom's main business today is IVPN (Internet Virtual Private Networks) and extensions of IVNPs. In the near-to-mid term, the company's goal is to improve quality of service issues. Customer demand strong end-to-end service level agreements. In five years, customers will be using the net for more business-critical applications.
Don Vandiver, VP for Strategic Planning, Royal Ahold

Royal Ahold's near-term focus is on increasing customer touchpoints. The company bought Peapod last year, a home-delivery grocery service. Customers can use the web, phone or fax to place their grocery orders. The company is looking expand these touchpoints to offer customers broader choice. The difficulty lies in predicting which touchpoints the customers will choose, be they PDAs, smart phones, etc. Royal Ahold is also is experimenting with a customer portal placed on a shopping cart that would track a consumers location in the store and deliver promotional material as the customer walks by the item, not at the checkout.

Al-Noor Ramji, EVP and CIO, Qwest Communications

Qwest's IT group is focused on increasing efficiency in the business. For example, Qwest has an intelligent application that delivers the full corporate desktop securely through any browser. Through this application, it doesn't matter where the data center is located. In terms of the future, Qwest is expanding customer self-service options and creating a community whereby Qwest customers can exchange information with each other.

Roundtable Discussion

Discussion focused on the tangible benefits that companies are getting from eBusiness. For example, Qwest has reduced the cost to deliver DSL service by half with the web, and has a goal to reduce the cost to 1/10th of its present cost by next year.

For Royal Ahold, the goal is to reduce the cost to serve by reducing supply chain costs. The industry average is 15 cents a case for the supply chain, but Wal-Mart's cost is only 1 cent per case. All retailers are working to match Wal-Mart's efficiencies by using the web, using technology such as radio-frequency ID tags, and changing their business practices.

Other companies have seen the greatest eBusiness payoffs from electronic auctions. Using e-auctions for sourcing has produced obvious, measurable results. The dark side is when the company itself is forced to be the bidder in an online auction.

At 3M, the CEO is driving e-productivity, so supply chain management, e-sourcing, e-auctions and vendor-managed inventory have all brought benefits to the company. For the future, the goal is to improve productivity on the customer side, such as by capturing more sales on through the web rather than through EDI.

HP has seen the eBusiness payoff in reduced supply chain costs, but the biggest surprising gain has been in collaborative product development. HP uses the web to enable co-development 24 hours a day using a net-based set of tools. Other companies like Intel also rely on virtual product teams, but these teams raise the issue of security and the possibility of electronic terrorism. Auditing code that has been written overseas was mentioned as an issue of concern.
1.6. Working Group Discussion: The Agenda for Making eBusiness Pay Off

The CIOs split into three working groups to consider the IT-related agenda for senior executives, academic researchers, and government policy makers. Each group considered the issues, goals, and next steps of these contributors to the future of IT.

The Agenda for Senior Executives

The key issues which this working group saw were:
* increased virtualization raises issues around security and trust among employees, partners and customers
* increased integration (within the organization itself)
* the need to have IT people adopt a customer service orientation (providing IT service)
* IT accountability to deliver a project with business sponsorship of the project.

The goals are:
* migrate quickly from legacy applications so as to free up the capital to be allocated to new projects
* increase utilization of new processes and enabling tools
* support international teams working effectively worldwide
* business model experimentation to see which models impact the portfolio of projects.

What must be done:
* create IT tools literacy at all four levels of the company: CEO, executive management, middle management and front line.
* define IT metrics to measure the value delivered by IT

The Agenda for Research

Security was the key issue raised by this group: how to promote openness without comprising security. Companies are struggling with how to inspect code that is developed offshore and how to protect the company from electronic terrorism. New research efforts could better define "security" and uncover new means to counter emerging and unanticipated threats to the information infrastructures of the country and its corporations.

Similarly, companies look to gain efficiency by removing duplication of effort, but again security issues arise. For example, many companies use customer names and addresses, duplicating identical information. The US economy would see gains if that duplication were removed, but that would require increased security. New research could examine mechanisms for using information without needlessly violating privacy or compromising security. Finally, this working group worried about the drop in company investment in research, citing the R&D centers at major companies that have been discontinued. Academic research could either supplement lagging corporate research or help corporate research organizations build a business case for their existence.
The Agenda for Policymakers

This working group identified two key issues for policymakers: encouraging national competitiveness in knowledge work and removing barriers to wireless and broadband deployment.

In the area of knowledge work, the goal is to make the US a sustainable center of competitiveness for high value knowledge work. The barrier to this goal is labor cost. The policy is to move toward universal high-performance connectivity, give investment incentives, and loosen immigration laws for high-skill workers.

In the area of wireless deployment, the group saw the goals as being to improve business productivity, to stimulate business development, and to enable universal access. The barrier to progress on these goals is the current lobbying power of incumbent regulated monopolies. The rate of deployment needs to be speeded up. The agenda for policymakers is open access to markets and accelerate deregulation.

1.7. CIO Plenary Panel Making eBusiness Pay Off: Lessons from the MIT CIO Summit

Ron Hanners, EVP, J. C. Penney Company, Inc.
Richard Ricks, CIO, Nortel Networks
Charles Bravo, CTO, US Postal Service
Al-Noor Ramji, EVP and CIO, Qwest Communications

These four CIOs discussed questions and issues raised by the moderator and by the audience.

eBusiness Penetration

At the start of the CIO Summit, CIOs were asked to judge how far they thought the internet had penetrated into their organization. The answers ranged from 2-42%, with 10% being the average. Protocols were the key impediment to deeper penetration. Richard Ricks, CIO, Nortel Networks, pointed to the tremendous pull for IP protocol and the advantages of that open platform. Similarly, if the Semantic Web remains open and free, companies could take advantage of RDF technology to link data together better.

Removing Channel Conflict

Ron Hanners, EVP, J. C. Penney Company, Inc., described how for JCPenney, one of the key challenges was convincing the 1100 bricks and mortar stores that the JCPenney website was not going to take business away from them. JCPenney did that by crediting every sale made within a given zip code to the retail store in that zip code. In this way, JCPenney removed the issue of channel conflict. In addition, business at the website drove further business at the retail store. The issue of pricing remained a thorny issue. Customers expect the same price everywhere, and if they see different prices, they want an explanation of why the prices are different. JCPenney has taken such calls at its call center, although customers do understand that they may pay more for convenience. The difficulty is that the web enables
personal pricing, but the demand for a single price loses that advantage. What JCPenney has found, however, is that if prices vary by size or color of item, customers see the variation as a treasure hunt, and the size of their total purchase increases.

Also contrary to what one may think, email has not replaced traditional mail. The US Post Office saw no reduction in its mail volume (until after the 911 attacks and anthrax scare). Indeed AOL is sending CDs by mail, Dell Computer sends catalogs, and JCPenney's catalog volume has increased, not decreased.

**Lower Costs**

Initially, companies thought that sales generated on the web would cost less than sales from traditional channels. While that is true, companies have found that actually their costs for all channels are reduced by using the web. For example, the web can be used for customer support and also to provide information to floor sales associates, thus reducing cost and improving productivity for retail stores as well.

**Rise of Wireless**

Both Qwest and Nortel Networks have seen a rise in wireless use. Traveling executives, salespeople and field service technicians all use cellphones and RIM technology in support of service and productivity. Al-Noor Ramji, EVP and CIO, Qwest Communications said that wireless LANs in particular are booming because it offers a great convenience. Overseas, wireless use is even greater in countries where the physical infrastructure (including locations of public phones) is lacking. In India, wireless service is better and more reliable than wireline service. In Japan, wireless phones are replacing wireline phones; 20% of Japanese homes do not have wireline phones.

At the same time, transactions by wireless devices (such as banking transactions) have not taken off. The reason is due to the interface. Tiny screens and buttons are not very easy or convenient to use, and there is no compelling reason to use a mobile solution for these transactions. As standards like 3G become pervasive, however, wireless PCs will become more pervasive. Multifunction capability will be a driver as people try to replace a toolbelt full of devices with a single multifunction device.

**Data Access and Data Use**

At JCPenney, customer data is shared within the company, not owned by a particular department. Data is essential for all levels of the company because the ultimate goal is customer service. At Royal Ahold, in particular the Stop & Shop stores, there is much talk about using the web for one-to-one communication with the customer rather than mass marketing. Currently, however, the company is moving slowly so as not to be intrusive into customers' lives.

Results from Prof. Brynjolfsson's research studies have shown that companies that put restricted internet access policies in place were less productive than companies who granted broader access. Access to data improved employee productivity.
Lessons Learned

The most positive move which the USPS made regarding eBusiness was deploying the USPS.com channel. The postal services receives 800,000 lookups per day tracking some of the 680 million packages, express and priority mail items delivered each day. The self-service look-ups greatly reduce the need for call center labor. Nortel, likewise has gained tremendous benefits by creating a self-service infrastructure. Nortel has a global web where each employee can keep their own data. Employees need only a single password (Nortel developed a system called Norpass), eliminating the need for an employee to have multiple passwords to access different databases.

For JCPenney, their most positive eBusiness action was to share responsibility between IT people and business people on the dot-com side of the business, ensuring both business and IT-skilled participation. JCPenney.com was especially glad that it did not accept venture capital funding.

2. Themes

2.1. Shifting Landscapes

The landscape of IT is changing as technology and the world evolve. The Internet has changed from a noncommercial novelty to a maturing element of the economic infrastructure. More companies recognize the strategic importance of IT and are looking to derive greater business value from IT investments. The shifting economic landscape is leading a new emphasis on the customer and new developments in Asia.

IT: From Cost Center to Business Unit

A number of CIOs commented on the shift in the corporate perspective of IT. In many companies, the IT department has gained greater respect and responsibilities. More companies view IT as an important strategic element of the business, not just a cost center. But as a business, IT must now justify its impact to both the top line and the bottom line. CIOs from HP and Royal Ahold felt that their chief executives "got IT." But this shift in perspective places new demands on both CIOs and other top executives.

Intel's CIO Doug Busch advocated the requirement for "T-shaped" executives -- executives with deep vertical knowledge in one functional area and a shallower top-level understanding of a wide range of business areas. This requirement applies to CIOs as well as other senior executives. The CIO needs to understand the business and participate in a broad range of business decisions. Likewise, other executives need an understanding of information technology and e-business strategy to contribute to top-level decisions that have an IT component.
The Gartner Group offered the contrary view that top executives at some companies only recently learned to spell "I-T," and other CIOs admitted the need for more work to put IT on a business footing. Although IT has always created value, IT departments have not done a good job of documenting that value and marketing the business value of new IT initiatives to their internal customers. Rather than simply tout the next cool technology, IT executives need to construct business cases that establish current operating performance and justify the value of expected performance improvements. This shift also increases the responsibilities of the IT organization -- from delivering IT applications to delivering business performance enhancements.

To demonstrate IT's business value, Intel publishes an "Annual Report" on IT and its business impact. This report delineates the business impact of information technology as if it were a business unit of Intel. Nortel mentioned how the shift to IT-as-business had changed many practices within its IT organization -- including using smaller phased projects to mitigate technical risk and new processes to measure and validate the results of IT projects. JCPenney described how commingling business and IT personnel helped generate mutual understanding and superior technical and business results.

**Increased Role of Governance**

Prof. Weil argued for increased formal governance by CIOs -- leadership by itself is insufficient. As IT plays a larger role in organizations, CIOs need to build formal decision making processes. Moreover, as Prof. Brynjolfsson argued, these decision-making processes and decision rights need to be coherent with respect to the goals and values of the organization.

The benefits of well-designed IT governance include increasing the productivity of the CIO and increasing effectiveness for IT overall. Formalized processes for routine decisions remove the mass of minutia that could swamp even the most talented IT executives. Moreover, both EQUANT/ France Telecom and HP cited governance as a key success factor to M&A and post-merger integration. Well-designed governance systems help accelerate the myriad decisions attendant with merging the information systems of two companies. For example, HP is laying the groundwork for Day-One availability of key IT services within Compaq when that acquisition occurs.

**Shifting Focus to the Customer**

Many companies are shifting the focus of IT development toward the customer-side of the business. These efforts go beyond mere order-entry systems or brochureware to create more comprehensive IT-mediated customer touchpoints. Companies are investing in CRM (Customer Relationship Management) and SFA (Sales Force Automation) to increase customer satisfaction, customer retention, customer profitability, and salesforce productivity. Improved customer-related back-office functions will also reduce the cost of service and accelerate cycle times (e.g., reducing DSO by automatically reconciling discrepancies). Companies such as Royal Ahold and GM want to better understand their customers -- creating behavioral models to predict how customers might respond to new products or
new promotions. Other companies, such as Qwest and 3M, are interested in the use of customer self-service as a means of providing low-cost 24x7 dialog between the customer and the company.

This shift to the customer-side is not surprising in context of the current economic climate. In the prior times of extreme growth (but little inflation or pricing power), companies sought to improve supply chain processes to accelerate flows and eliminate costs. As such, many prior IT efforts focused on supply chain integration and ERP. During good times, no one had trouble attracting and retaining customers. But recently, when growth stopped and the economy slowed, companies saw the threat to revenues. This motivated the shift in focus to acquiring new customers and retaining existing customers.

Companies also noted the accelerating pace of change in terms of changing customer tastes. Part of GM’s rationale for building the ACA (Auto Choice Advisor) was the need to gain more timely data on the fast-evolving preferences of new car buyers. Although GM still uses traditional focus groups to gather in-depth market research, the company feels that the months-long process of creating, running, and analyzing focus group research is too long. Online technology, such as ACA, makes it easy to insert new preference questions quickly and gather a large sample of data.

Shift to Asia: Competitiveness and Security Issues

Asia is rising in economic importance as a supplier, new customer base, and source of IT expertise. Both India and China have a massive population of skilled workers and new middle class consumers. China promises to become a new center for technology hardware manufacturing while India promises to become a new center for software development and IT services. Although some CIOs were dubious of the blank-paper creativity of foreign engineers, others spoke of personal experience with the increasingly talented people in new global centers of IT competence. For example, Compaq described the evolving nature of its use of Asian labor for IT. Initially, Compaq limited use of offshore IT labor to only the most routine IT tasks. Recently, Compaq has found that Asian IT workers can now handle more complex programming tasks. As yet, Compaq still does its most strategic IT engineering work (with a 3-5 year time frame) in North America. But the company admitted that, in time, Asian IT shops might gain the skills to handle even the most complex IT tasks. Cisco noted the rapid rise of IT companies in India and the fact that the products of these companies target the same markets and applications as their American counterparts.

Yet this shift to Asia comes with two major downsides. The first is the issue of the national welfare of the U.S. and western nations. Western nations have ceded much of the low-skill end of their economies to low-cost producer nations -- taking the high-skill high-ground. The U.S. has bet that innovation, IT, and a highly skilled workforce would allow it to maintain high wages and quality-of-life. Yet countries such as China and India have a rising class of high-skill, low-pay workers that threaten the cozy lives of Westerners. Moreover, government protectionism is less likely to prevent the importation of low-cost software of private intranets than it was the importation of low-cost steel over public shipping lanes. One executive spoke of the chill he felt when the Indian and Chinese prime ministers met and spoke of their countries respective potentials to dominate both IT and manufacturing.
Second, recent events have renewed companies' concerns for security. Companies are unsure about how to ensure the security of software developed offshore. Such software could contain malicious bugs or backdoors that leave companies (or their customers or suppliers) vulnerable to cyberterrorism. The thought of auditing millions of lines of imported code seems daunting. Yet the cost benefits of offshore development make it hard for companies to ignore this new global labor pool.

Some CIOs argued for a call to action to improve the long-term competitiveness of the U.S. and western nations. These executives ridiculed immigration policies that let foreign students get a Ph.D. in the U.S. and then forced them to return to their native countries. The executives argued that this country should encourage the best and the brightest of other countries to emigrate here. Executives also argued for increased spending on the "R" part of R&D -- that many corporate R&D labs have turned their backs on the basic research that led to so many modern-day technologies. In particular, one CIO noted how Dell's emphasis on aggressive cost-based competition is eviscerating R&D budgets in the PC industry. Finally, CIOs argued for incentives and policies to increase the roll-out and adoption of broadband and wireless technologies. One of the obstacles to the full exploitation of the Internet is the lack of ubiquitous connectivity. Internet applications are hobbled by the need for standalone operation when a connection to the net is not available.

New Complexity from Metamediaries and Bundling

Information technology enables new complex products, services, and business models. Metamediaries and bundling means that disparate products and services with a common theme can be combined in novel ways. For example, GM plans to use trusted advisor technology to offer a range of car-related services that might include insurance, financing, and perhaps even used cars. Given that people come to GM to buy cars, GM is in a good position to offer other products and services (created by other companies) to these customers. Companies, like GM, are looking for new sources of revenues and new ways to deepen their relationships with customers.

Qwest described the challenges to these new complex business models. Being the point of contact for complex bundled products and services brings new responsibilities. For example, Qwest's DSL service represents a bundle with three distinct components: a local telecom line and service from Qwest, a DSL modem from Cisco, and MSN software and internet service from Microsoft. Supporting DSL customers can be quite difficult and Qwest spends between $12 and $300 to support each new customer. The challenge with bundled systems is that a technical problem can easily be caused by any of the three components. Yet, when a customer calls Qwest with a problem with DSL, they do not want Qwest to refer them to Cisco or Microsoft. Qwest is using improved internal coordination and customer self service to reduce the support costs for this bundled service. Qwest is also working on mutual self-service applications in which customers help other customers -- creating a mutually self-supporting community.
2.2. Key Questions

IT executives face many thorny questions. CIOs worry about their roles and the trade-offs that they must make. Important decisions of today will impact the security and trustworthiness of companies tomorrow.

What is eBusiness?

This question was deemed resoundly irrelevant by the summit attendees -- all business is eBusiness now. IT plays such a pervasive role in all aspects of business that the distinction between businesses and eBusiness is gone. Companies use internet technologies and IT for all aspects of operations from the supply side to internal operations to the demand side. Companies would no more distinguish between the parts of business that use IT than they would distinguish between the parts of business that use electricity or not.

Pick One: Openness, Security, or Privacy

CIOs discussed the sometimes contradictory goals of openness, security, and privacy. Prof. Brynjolfsson emphasized the importance of openness in leveraging IT investments. Widespread information-sharing lets users find innovative and value-added uses for corporate information. Companies benefit when more users can find more uses for enterprise data and enterprise applications. Yet allowing everyone access to everything also creates risks to corporate security and the privacy of customers and business partners. For example, Cisco mentioned that it prides itself on openness in placing everything on its widely-accessible intranet. Yet, the company feels that it needs to increase security so that in-house contractors from competing vendors cannot access sensitive documents concerning one another.

Privacy can create security problems. GM's AutoChoice Advisor is a web-based trusted advisor that lets people input preferences about new cars and receive an unbiased list of cars that best fit their needs. GM chose to err on the side of privacy in fielding its trusted advisor -- carefully avoiding the collection and abuse of customer information. GM benefits from its confessional-like setup -- GM hears customer's unfettered opinions about cars but cannot identify individual opinion providers (unless they opt-in). Yet this practice leaves GM vulnerable to spoofing or ballot-stuffing in which a vociferous minority or a competitor's representatives try to skew the results of GM's polls.

Companies are also concerned about how to best use, but not abuse, new data on consumers and new channels for communicating with consumers. For example, Royal Ahold has created massive data warehouses on the buying patterns of consumers at the company's far-flung chains of grocery and convenience stores. The company could easily mine this data to create massive numbers of personalized marketing or promotional messages. Yet Royal Ahold does not want to destroy the opportunity to create a dialog with the consumers by abusing its customer touchpoints.

CIO or CTO: Which is Which?

Attendees of the summit included both CIOs and CTOs -- leading to questions about the relative roles of these two positions. The discussion revealed that there are two very different technology executive
roles in companies, but that the labels are interchangeable. The most important dichotomy was that of a higher-level business role and a lower-level technical role. The higher-level business role was a very senior executive position that included substantive involvement with all manner of strategic business decisions. Such a person might be a peer to business unit executives and report directly to the CEO of the company. The lower-level executive, who reports to the higher-level executive, plays a more narrowly and deeply focused technical role. But whether these roles carried the label of CIO versus CTO (whether the CIO reports to the CTO or vice versa) varied among the companies.

The two roles also tended to split duties along different time frames -- one executive manages near-term, daily, operational IT systems, the other executive manages long-term, strategic, new technologies. Again, companies varied on the labels assigned to these roles and whether operational IT or strategic new technology was assigned to the higher-level executive.

Confusing the issue was the reality that many companies produce products and services with substantive technical content. Thus, companies such as Intel have technology executive roles that distinguish between the operational technologies that underpin enterprise business processes and the product technologies that underpin the company's offerings.

**IT Drives Improvements, But Does IT Make Things Better?**

McKann-Erickson posed a provocative question on the ultimate impact of IT. Although everyone sees the benefits of IT in terms of reduced costs, accelerated processes, and improved productivity, there is the nagging question of whether IT brings improved quality in the ultimate sense. In particular, McKann-Erickson wondered whether its customers are really happier with the company. Although McKann-Erickson's customers certainly benefit from the company's IT systems, it is not known if these same systems actually increase customer satisfaction. This question highlights the thorny issue of the intangible effects of IT systems on companies, their employees, suppliers, and customers. For example, CIOs commented that their companies enjoy the cost-reducing effects of using reverse auctions with their suppliers, but they hate participating in these auctions as a supplier.

Furthermore, McKann-Erickson's comment was echoed by an audience member's pointed question about the impact of always-connected systems on employees' well being. Although Prof. Brynjolfsson's data shows that IT increases productivity, some argue that the gains come from working more hours rather than working more productively. The counterargument is that ubiquitous interconnections let employees boost quality of life through flextime and telecommuting. Working parents can fulfill their responsibilities both as a caregiver and as an employee.

While the cat's away, the mice do play, unless the cat has a Blackberry and sends wireless e-mails to his or her mice. Paradoxically, some CIOs found peace of mind from being always connected. Never being out-of-touch means never having to worry about an accumulation of fresh problems at the office. These CIOs proudly sported their Blackberry pagers and cell phones and liked that they could get a jump on any new problems by firing off an e-mail or voice message while on the road. Whether ubiquitous interconnections are empowering or enervating depends on the personality and personal situation of each individual.
2.3. Future of Innovation

When asked about the 3-5 year outlook for technology, most CIOs expressed skepticism about predicting the future of the fast-paced world of IT. Indeed, some expressed frustration about the inability to predict which IT standard or practices would be adopted when. Network effects create a chicken-and-egg problem for the adopters of new technology. CIOs also expressed concern about maintaining the pace of innovation and of adopting innovations.

**Innovation + Adoption = Value**

IT executives know well that building a better mousetrap does not make the business world beat a path to their door. Innovation is necessary but not sufficient for creating value in the organization. For example, 3M bemoaned the fact that its business executives do not understand the business benefits that IT can bring. McKann-Erickson echoed this challenge, saying that in the advertising business, IT applications need to be well packaged and sexy to entice the company's creative staff to use them. Thus, IT executives must work hard to drive the adoption of innovative information technology.

Moreover, adoption is more than just putting an application on the worker's desktop. Prof. Brynjolfsson's research highlights the crucial role of complementary organizational changes that create a high return on IT investment. His study of total factor productivity growth shows that IT investment does increase productivity, but that some companies enjoy much larger IT-mediated increases in business performance. In researching why some companies benefit from IT more than do others, he discovered seven organizational characteristics of these companies. Characteristics of the "Digital Organization" included empowerment, open access to information, strong performance-linked incentives, active investment in corporate culture, regular communication of strategic goals, and heavy emphasis on recruiting and training top employees. Other policies can actually punish the adoption of innovation. For example, some companies use transfer pricing schemes that basically force the early adopters of an innovation to pay the full costs of that innovation. The key is a coherent internal alignment of business values, culture, processes, and IT efforts with the performance of the organization.

For example, 3M is increasing the business value of its IT efforts by aligning them with top-level directives to reduce costs at the company. 3M's CIO is marketing "quick win" IT applications that help business units achieve their cost-cutting goals. Overall, 3M's IT budget remains unchanged, but its current focus is on leveraging existing IT assets -- increasing the adoption of existing applications to increase business value.

Numerous comments and discussions centered on the problem of information hoarding. In too many organizations, the unofficial credo is personal knowledge equals personal power. Professional services partnerships suffer from this problem in the form of incentives that equate prestige with the number of deals or clients that a partner is involved with. Partners who develop and horde valuable skills are rewarded by personally being called upon for deals, compared to partners who freely share their information and help others to develop these valuable skills. Yet openness and information sharing are the keys to creating the self-reinforcing network effects for which the internet is famous. As the world becomes both more complex and faster-paced, companies must turn away from the "inspired-genius" model and toward the high-performance collaborative team model.
Barriers to Trade = Barriers to Innovation

In discussing the changing nature of the global economy, a number of CIOs expressed fear of protectionist or isolationist government policies. The idea that a country can keep innovation within its borders and keep competitors out seemed ludicrous when applied to boundaryless phenomena such as the Internet. These CIO felt that protectionism treats the symptoms, not the causes of inexorable shifts in world economic power. Rather than building walls around the country, the executives argued for policies to improve long-term competitiveness: boosting education, research, broadband, and wireless.

A form of protectionism even occurs when companies try to hide the competition from their potential customers. People thought GM was crazy to feature unbiased information about competitor's cars on GM's Auto Choice Advisor site. Yet GM convincingly argued that consumers will learn about non-GM cars whether GM likes it or not. And, rather than simply promoting current models, GM decided that if its models are not competitive, the company must learn what customers do want. Auto Choice Advisor offers unbiased advice about competing vehicles, but it provides substantive benefits for GM. GM learns about the actual preferences of new car buyers, helps buyers find the GM car that best fits their needs (if a GM car can fit their needs), and lets consumers say what GM would need to do to sell a car to them. GM is also trying to build trust with consumers -- improving GM's brand name by showing consumers that GM is not afraid of the competition.

Patents: Boon or Bane of Innovation

Tim Berners-Lee refuted conventional wisdom regarding patents. Conventional wisdom suggests that patents encourage innovation by creating economic incentives that encourage new inventions. Tim Berners-Lee argued that with the world wide web, patents and greed create fragmentation, stifle innovation, and reduce the opportunity for everyone. The idea that someone could patent old, basic or obvious ideas such as "one-click" shopping or hyperlinks is a travesty.

The point is that, unlike many other inventions, the value of many an IT innovation is not intrinsic to that idea, but is, instead, a function of all the complementary inventions and products that mesh with that first innovation. IT innovations often enjoy network effects in which the value increases with the square of the number of users (and number of uses). Yet selfish attempts to limit widespread use of the invention, by charging onerous royalties and using restrictive legal language, reduce the number of users. Worse, the legal intimidation by patent-owning companies tends to discourage other companies from creating complementary innovations that drive widespread adoption. Rather than try to profit from a better proprietary mousetrap, companies can create greater long-term revenues and profits by creating a thriving, open, ecosystem of product and service vendors. Rather than stake claims on small slices of the economic pie, companies can create new and larger pies.

Some of the blame goes to an antiquated patent system and judicial case law that is better suited to protecting the inventors of widgets rather than to foster mutually-beneficial adoption of information technology. Too many patent office examiners lack an understanding of the prior art in computer science, technology, and business processes. Thus, they cannot recognize when someone slaps an "e" in front of a routine business activity and claims it is a great new invention. Likewise, the judicial system is ill-equipped to handle issues requiring a sophisticated understanding of technology. Although patents
were created to foster innovation, Tim Berners-Lee fears that patents may derail the progress of innovation and prevent the widespread adoption of useful IT standards.

**Always 10% Done: The Receding Completion Date for the Internet**

At the outset of the summit, the CIOs introduced themselves and answered the question of how far along their company was in applying the internet to business. The answers, some tongue-in-cheek, ranged from 2% to 42%, with the most prevalent answer being 10%. Yet the comments by the executives highlighted the ongoing, evolving nature of the internet. Yesterday's exciting innovation is tomorrow's mundane business practice. The internet has no end state and so companies will never tap 100% of the potential for the Internet. Rather companies will always be 10% of the way toward an ever-rising bar.