THE POWER OF SYSTEMS

Systems Thinking: What Does It Mean for Business?
Reforming the Social Security System
E-Commerce Systems: Online for Success
How Career Mobility Impacts the Business System
In the College of Business, we offer classes on important business topics taught by world-class faculty. And we offer our students the opportunity to experience the world firsthand.

Meeting with an entrepreneur in a small Chinese village is an unforgettable memory for twenty graduate students who participated in an international program earlier this year. Students in the Illinois M BA traveled to Poland in January, and their experiences were life-altering. Hundreds of College of Business undergraduates have taken advantage of our Study Abroad program and lived and learned outside the U S for a semester, a summer, or a year.

The College of Business is committed to broadening our students’ understanding of global business systems — from e-commerce and information management to finance, inventory management, and business systems. Classes are, and will continue to be, the foundation of the curricula in the College. But we recognize that direct exposure is critical to improve understanding of international business, new social institutions, and the interdependent parts that comprise our global society. Such exposure prepares our graduates for active participation in global systems, as individuals and as members of the workforce.

An educated workforce with a broad perspective and knowledge is the motivating force that propels the global economic system. We are proud that our graduates are prepared to be that force across the state, the country, and the world.

Avijit Ghosh
Dean
USING SYSTEMS THINKING TO REACH NEW HEIGHTS IN BUSINESS
Businesses benefit by taking a big picture approach.

E-COMMERCE SYSTEMS
Understanding the keys to online business success.

THE TIES THAT BIND - AND BREAK
How does career mobility impact business relationships?

REFORMING SOCIAL SECURITY
Exploring ways to improve the system.

CATCHING THE RADIO WAVE
RFID systems track products through the supply chain.

WAY BEYOND THE DEWEY DECIMAL SYSTEM
The Business & Economics Library provides tools for world-class research.

RESEARCH FOCUS: NEW PRODUCT DEVELOPMENT
Information management systems make the difference.

RESEARCH FOCUS: FASHION OVERSTOCK
How outlet stores influence inventory management systems.

4 FOR 4: IS THE PRICE RIGHT?
What role does price play in buying and selling decisions?

COLLEGE BRIEFS
News from the College of Business
Have you ever been taken in by a sales pitch that seemed too good to be true—and sure enough it was? Have you ever jumped at a money-saving deal only to find out later that it cost more in the long run than other options that seemed too expensive at the time?

The same types of errors are made in the business world, often with dire consequences. For instance, a company may implement cost-cutting measures that backfire. Instead of saving money, they lessen the quality of the company’s products, which can result in recalls, lawsuits, and the loss of customers.

Fortunately, scientists and economists have a good idea how these debacles come about, and they have developed a method to help business leaders avoid them. It’s called systems thinking, and it seeks to help the business world avoid the kind of one-dimensional analysis that can lead to disaster.

Systems thinking serves up a mixture of common sense and sophisticated formulas to help us step back and see the big picture. Far too often, we focus only on what’s right in front of us when we make decisions—and that can lead us over the cliff into the abyss.

“Systems thinking would be beneficial across a wide variety of business issues,” said Ira Solomon, professor and head of the accountancy department. He believes that systems thinking can help business planners figure out what could go wrong when they are assessing the degree of risk associated with different options. In addition, Solomon said a systems thinking approach could have detected some of the corporate accounting scandals that rocked the country in recent years.

Looking at the Big Picture

WorldCom, the once high-flying phone company, provides such an example. Although its books hid the reality that the company was losing money by the truckload, systems thinkers believe that WorldCom’s deceptions could have been discovered earlier. All that was needed was to look at the big picture—that is, at the telecom industry as a whole. While the overall industry was losing its shirt, WorldCom was reporting enormous profits.

“You had tons of overcapacity in the telecom industry, which meant that companies had to cut their prices to get business,” said Mark Peecher, associate professor of accountancy. “So why was WorldCom still making tons of money over time? You’ve got to ask yourself how they were squeezing out profit margins. They were ostensibly making billions at the same time AT&T was losing billions. If you understood the telecom business, your mind would tell you that it was quite improbable that WorldCom could be making that much money,” Peecher said.

Traditionally, auditors haven’t been trained to look at the big picture using systems thinking approaches. They are more likely to be taught to look for fraud or other problems by sampling bits and pieces of a company’s books in search of red flags. The idea is to keep taking samples until a red flag goes up or until it appears reasonable to conclude that there isn’t a problem.

Sampling often works quite well. But it presupposes a low misstatement rate and so does not work well in instances where companies have cooked their books. “Financial statements involve many estimates and a great deal of judgment, and you couldn’t have found the problems at WorldCom unless you understood the business and the industry,” said Rachel Schwartz, associate professor of accountancy and a systems thinking advocate. “WorldCom argued that it expected an insatiable future demand for its services, and therefore it deferred the expensing of billions of dollars of costs until the future revenues are realized. But clearly, expectations for insatiable demand in an industry that was already saturated with overcapacity are nothing but bogus, and therefore the deferral of expenses is nothing but fraudulent. It is this kind of global thinking that would have been required to uncover WorldCom’s fraud.”

Taking this big picture approach is part of the learning that Illinois accountancy students engage in today. “When I was an undergraduate, the mantra was to test the controls or the...
books directly by sampling until the cows come home,” said Peacher. “And there was one paragraph in the textbook that said you should understand the business. Now we take the systems approach, stressing that you should understand the business. We bring the systems approach in as early as the sophomore year. And we’re trying to get it into every course.”

Everything is a System

Of course, some people always have been able to step back and see the big picture. Early in the 20th century, for example, Henry Ford realized that the assembly line could help him produce inexpensive automobiles for the masses and give him a price advantage over competitors. However, systems thinking as a formal discipline didn’t begin to emerge until the 1940s when scholars used concepts from physics, biology, and engineering to create the new field. Later, systems thinking expanded from science into economics, business management, and even philosophy.

The idea is that everything on our planet can be thought of as a system. An ant colony, for example, is a system in which hoards of individual ants work together in a way that ensures the survival of the group. The airline industry is a system that links people and places and delivers goods and services. In both cases, Systems thinking encourages business leaders to see the big picture and act accordingly. But that isn’t always possible. Take insurance companies. It would be hard to find an industry that works harder to see the big picture. In the insurance industry, actuaries strive to assess the likelihood of things going wrong. That allows their companies to set rates high enough to make a profit.

But sometimes insurance companies still fall victim to unpredictable events. Insurers could hardly have foreseen the four hurricane strikes on Florida in the fall of 2004. “Their weather models expected that the storms would disperse randomly,” said Stephen D’Arcy, professor of finance. “In 2004, the storms went in the same direction each time.”

The industry could make the assumption that such unexpected events will eventually happen, but practical realities prevent that. “You can’t charge customers for everything that might occur,” he said. “Either customers wouldn’t pay the higher rates or insurance commissioners wouldn’t allow them. Within a regulated industry or a competitive environment, you can’t raise your rates before the trends start to change. The best systems theory can do for the insurance industry is get it ready to move quickly when things do change.”
The Securities and Exchange Commission wants to use computers to uncover corporate fraud. In theory, it's a straightforward task - simply design software that will scan corporate financial statements for the telltale signs that something is amiss. The reality is more complex. It may take a decade to design and implement a working system, said Bernell Stone, a former senior financial analyst at the agency. Stone worked on the project during the initial planning stages.

Even ten years of work might not get the job done if the agency doesn't plan the project well. That's where systems thinking comes in, said Stone, now a professor of finance at Brigham Young University's Marriott School of Finance.

Systems thinking says that before you act you should step back and evaluate how one aspect of a system interacts with the other components. When SEC officials did that, they found two problems that must be solved. First, they need to take corporate financial reports submitted to the SEC and put them into a format that computer software can read. In addition, they must design software that can look for fraud.

But that isn't the end of the matter. The software also has to generate reports that a wide variety of officials can understand. The group of end users includes lawyers, accountants, industry specialists, the SEC's governing body of commissioners, and prosecutors at the Justice Department who handle criminal cases referred by the SEC's staff.

Meeting the needs of these users is integral to the success of the overall effort. And according to Mark Peecher, associate professor of accountancy at Illinois, the systems thinking approach helps you anticipate how those needs are likely to change over time.

"In complex projects such as this, systems thinkers would note that fraud rates could grow exponentially. Once such growth occurs, merely ramping up surveillance might not cause fraud rates to revert to historic levels," said Peecher, who cites the work of Jon Davis, Gary Hacht, and Jon Perkins on the subject in the January 2003 issue of The Accounting Review.

Systems thinkers also would note the need to guard against successful anti-fraud programs becoming their own worst enemy. "Over time there could be mounting political pressure to cut funding for such programs unless they uncover increasingly more frauds of the ilk that they ought to have helped prevent in the first place," Peecher said.

The SEC's planners have already learned one important lesson - one static software system won't do the trick. Instead, they will have to come up with multiple systems that are easily modified and that are geared to specific industries, because the analysis would be quite different for a bank, an energy company, and a financial services firm. "The project is sufficiently complex that the system is going to evolve over time," said Stone.

There are interdependencies among components of the system that have implications for the whole. If the ant colony is disturbed by weather conditions, the ants must accommodate to survive. If mechanical problems cause delays in airline scheduling, passengers must rearrange their plans. The same is true whether you're working with the smallest ecosystem or the largest manufacturing system or whether you're trying to understand the intricacies of the cardiovascular system or the inner workings of an international banking system. In all cases, each individual system is a web of connections, where changes to one aspect of the system can have consequences throughout.

The systems thinking approach emphasizes connectedness and how connections change over time. In contrast to traditional analysis, which calls for isolating each piece of a system and studying it individually, systems thinking focuses on studying how one aspect of a system interacts with all of the other components. This creates a more expansive view and can often lead to different and innovative solutions than those generated by traditional analysis.

**Beyond Conventional Business Thinking**

Systems thinking has important implications in the world of business. It is a process that encourages us to examine complex organizations and make improvements by (1) understanding the connections, (2) evaluating how changes to each component will impact the whole system and over what time frame, and (3) not discounting any possible solutions, even those that are counterintuitive.

For instance, conventional business thinking holds that companies should try to organize themselves in a way that maximizes profits. By contrast, some systems thinkers maintain that corporations would do better in the long run if they put customer satisfaction first.

"We argue that the customer should be the driving force," said William Qualls, professor of business administration. "If you are a supplier and you sell a bad product to Wal-Mart, the customers bring the product back to the store. If that happens too often, Wal-Mart may not come back to you, and they may not buy any other products you want to sell them."

The same counterintuitive logic could apply to buying stock. For instance, you could be evaluating a stock and find a company that makes a very good product, claims a major share of its market, and has an astronomically high rate of growth. Why not buy the stock? Maybe you should. But Kevin Wasp, a lecturer in finance, suggests you might want to kick the tires first.

He cited the case of one top computer industry supplier that was doing very well.
before the tech stock bubble burst. The company was growing so fast that this single company would have been larger than the entire U.S. economy if the growth rate had continued for another four years.

Obviously the company could not sustain that rate of growth, and it didn’t, Waspi said. “You have to perform a reality check,” he added. “If you don’t step back and look at the big picture, you could end up investing in a very good company that happens to be a very bad investment.”

**Systems Thinking and Cost Control**

Another example of such counterintuitive thinking comes in the cost control arena. Standard business theory says it makes sense to hold costs down. And often, it does. But a systems thinker might conclude that cost-cutting sometimes leads to false economies.

John Sterman, a professor of management at MIT and a leading systems thinker, illustrated an example of false economy. While speaking at a recent College of Business symposium, he cited the hypothetical case of a health plan that limited its clients to cheaper, generic drugs.

“Their goal is to save money,” said Sterman. “But because they are using cheaper drugs, people won’t get better as fast. And they’re more likely to return to the doctor. In some cases, they may end up needing surgery or visiting the emergency room. Or they can remain contagious longer, and more people may get infected. In any case, the end goal of saving money isn’t met.”

Such a health plan could backfire because the cheaper drugs were inferior. However, that doesn’t mean that cutting costs is always wrong, just that such decisions need to be evaluated in light of the interactions with the overall system.

For instance, standard thinking in Henry Ford’s day advocated paying workers as little as possible. Ford was extremely cost conscious, yet in 1916, he took the unprecedented step of introducing the five-dollar-a-day pay scale for his workers. The workers obviously benefited, but what did Ford get out of it? He got his pick of the labor force, and he minimized worker turnover because well-paid workers were less likely to quit. That saved on retraining costs and kept his assembly line humming smoothly. One more thing—his workers could afford to buy his cars.

That’s systems thinking in action.

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Doug McInnis
It was a concept any wine steward would find distasteful. With a few clicks of the mouse, one could select the perfect wine for a discriminating palate, with the anonymity and ease afforded a consumer shopping from a home computer. An initial attempt by entrepreneurs to peddle wine online—from Chardonnay to Zinfandel—during the late 1990s was observed by Judith Gebauer, assistant professor in business administration. Ultimately, the online-only wine retailing effort failed for a variety of reasons, she says, including the obstacles related to complex government regulations and industry structures and an overestimation of the market.

The speculation of riches from the e-commerce boom in the late 1990s—and the bust that followed—are well documented. Those businesses that sank into Internet oblivion—along with those that kept afloat—have certain characteristics in common that can be used as a guide for developing and sustaining a commercially successful e-business.

Gebauer along with Michael J. Shaw, the Leonard C. and Mary Lou Hoeft Endowed Chair in Information Systems and a professor of business administration, have researched what it takes to succeed in the realm of e-commerce. “Part of the story is that running a successful electronic commerce venture takes more than just a concept,” says Shaw, who has co-authored a study on e-procurement with Gebauer. “You need to take into factors such as regulation. It may be a good concept by itself, but that explains how some of the e-commerce enthusiasm came down hard.”

Business Plan, Business Plan, Business Plan

One factor instrumental to developing an e-business—or adding an e-commerce component to an existing business—is to not overlook the business plan. Creating a viable business plan that addresses more than just the basics—marketing and promotion, finding and reaching a customer base, financial resources, and operations and management—is critical. In the Internet sphere, where competition is fierce and constantly evolving, start-ups must take into account the reactions of the established players in the market.

In the business-to-business market, for instance, several start-ups that marketed e-procurement systems enjoyed an initial period of success but ultimately failed because the established companies caught up with the new players and were able to offer the same features. “As soon as you become more successful, the existing companies will use their advantages to try to take your advantages away,” says Shaw.

The wine venture that Gebauer observed overestimated the market of people who would actually buy wine online at that particular time. Because many customers were used to asking a trusted person to make wine recommendations, new online-marketing models needed to be found to make up for the anonymity of the online venue. Additional factors played a role as well, says Gebauer. For instance, the company found it difficult to attract business partners, particularly wineries, to its innovative distribution model. Unlike other sectors, the wine industry is not one that embraces information technology easily. In addition, distribution channels in the wine industry are complex, due to tight regulations that vary by individual states, and difficult to change. Overall, these difficulties created an enormous burden. The efforts eventually collapsed, and the company was sold to a competitor that continued the business on a much smaller scale.

According to Gebauer, there are four key tasks that any new online retailer must be ready to address. “First, you must be ready to manage the processes of the new business itself, which is not a given,” she emphasizes. “It’s also necessary to understand the new technology to be deployed online as well as internally. Third, you must understand the market; every factor by itself is a serious challenge. And finally, you have to be able to understand the specific industry structure and legal system well enough to carve out a viable niche.”
The online grocery delivery company Peapod – now a subsidiary of Dutch grocer Royal Ahold – succeeded where its competitors failed, Gebauer says, because it followed this strategy. The company dedicated resources to finding a market for its service, a different clientele perhaps than the one usually targeted in the supermarket. Peapod discovered that its target market is dual-career families, and subsequently the company devoted significant effort to understand the targeted segment well.

“I think that’s one of the factors that many of the smaller start-ups have not really thought out – how do I establish myself within the marketplace other than performing a basic business case analysis. How do I fit in the bigger scheme?” says Gebauer. “This example is a good one where they started as an online retailer and now they have been bought. They are very much trying now to combine the old model with the new one, and to stay within their limits, instead of stepping on everyone’s toes around them.”

Making It Complementary

There are only a few online-only companies that are universally tagged with the Internet rags-to-riches label. Household names such as Amazon.com, Yahoo, Google, and eBay fit the bill. “They are successful because their brand name is very strong,” says Shaw. “Secondly, they have built a business model that has given them the first-mover advantage. By doing that, customers always go to their sites for products and services.”

Aside from those wildly successful e-businesses, fewer and fewer companies are online-only operations. Some of the most successful ventures into e-commerce currently, say Shaw and Gebauer, are those that are complementary to existing businesses. Companies involved in mail order and catalog have made an easy transition to incorporating websites offering electronic shopping capabilities.

“I think it’s better to go in incremental steps rather than trying to jump ahead and change the whole world in one gulp,” Gebauer explains. “There are examples where this has been successful, but it’s definitely more risky. In order to be successful with an incremental approach, you have to be clear on the current system and where you want to go. That’s why it’s so difficult.”

A success factor linking “brick and mortar” companies that have developed sustainable e-commerce ventures is that they communicate across channels – that is, they serve customers by allowing them to purchase items from the Internet portal and return them to an established store, or by offering an in-store pickup option. Gebauer and Shaw cite office supply retailer Office Depot in the business-to-consumer market and maintenance, repairs, and service equipment supplier WW Grainger in the business-to-business market as companies that exemplify this phenomenon. ”It’s really about making the service better,” Shaw says. “It’s not about a brand-new solution.”

Customer-Centric Approach

There’s one factor, no matter the customer (business or individual), that often dictates whether an e-commerce venture will prosper. The proprietor must stay focused on the end result – a happy customer – rather than the technology that enables a transaction to take place.

“One very important key to success is remembering that your primary focus should always be the business and the customers, not the technology,” says Gebauer. “One of the problems that a lot of the early start-ups had was that they were run by technology experts who understood how to do the programming but really didn’t have an understanding of the business. Now we’re seeing that it’s especially important to understand where you want to go with your system and how to integrate it.”

Several companies have been able to exploit the technology to create what is called the network effects. “The larger your customer base, the more the customer individually gets out of your service,” explains Shaw. “That’s something Amazon does by including other people’s reviews on their site. The more customers they have, the more benefit we get doing business with them. For eBay, the larger customer base they have, the more merchandise you can buy over their auction site. This idea of network effects is really particularly important.”

Back to the Future

While many e-businesses have come and gone since the Wild West days of Internet start-ups in the late 1990s, e-commerce sales have continued to grow. Five years ago, online retail sales totaled less than $20 billion. For 2004, the US Census Bureau estimates that the figures will top $60 billion. The potential of such sales and the presence of established online retailers like eBay, Google, Yahoo, Yahoo Japan, and Amazon.com, whose combined market value is around $230 billion, make e-businesses a solid player in the retail market.

Despite the dot-com bust, both existing businesses and entrepreneurs alike are constantly developing, and fine-tuning, ways to use the Internet for profit and market share. By learning from the failures of the early ventures and applying the known strategies for building a successful online business, the arena may not be such a bust after all.

– Laura Weiskopf Bleill
Keeping the System Humming

Research shows that firms tend to do business with companies they have worked with previously. As in Broschak's situation, people make investments in service relationships. They find ways to overcome problems in relationships and will make an effort to do so because acquiring new clients or changing to another service provider requires more effort. But when the players change, either because someone is promoted or finds a new job in a different company, ongoing service relationships are at risk.

Broschak's research into the dynamics of market ties shows that turnover of managers in certain jobs and positions increases the risk that business relationships will end. Using data from The Standard Directory of Advertising Agencies and The Standard Directory of Advertisers, Broschak analyzed information on advertisers that spent a minimum of $200,000 on national or multi-state advertising and on agencies of record for at least one national or multi-state account spending $200,000 or more on media per year. This 1986-1998 dataset allowed Broschak to test various hypotheses for his research.

Although he studied advertisers and advertising agencies, he believes that his results can be generalized to other professional services firms such as lawyers, accountants, and consultants. His research is among the first to evaluate how the careers of various players affect a firm's market ties.

Personnel Systems and the Domino Effect

As Joe Broschak's research shows, when an employee is promoted or leaves a company, there is a domino effect that ripples through the organizational system impacting costs, workload within the company, and even business relationships outside the organization.

But just how prevalent is job turnover? According to the latest figures from the Employee Benefit Research Institute, a public policy research organization, more than half of all adult American workers have been at their current job for fewer than five years. The median tenure for workers over 25 is now 4.4 years for women and 4.9 years for men. In addition, the median tenure for public sector workers over 20 years old is 7 years, which is nearly double the 3.6-year median reported for private sector workers.
Individuals who are involved in exchange relationships between firms bring certain skills to bear on their interactions. They learn how to conduct business with a specific firm, how to share proprietary information, and how to communicate effectively, all of which are examples of relationship-specific skills. Technical knowledge--such as developing an in-depth understanding of a client's products and services--is another important part of the equation. Finally, personal relationships--knowing how frequently someone wants a project update, for example--help build trust and enhance communication. These three skill sets contribute to making buyers and sellers more comfortable in market relationships and more confident about how a project will progress. The relative importance of each of those skills depends on the person and the situation.

The Players: Agencies and Clients

Every relationship has two sides. Broschak's study focused on professional service firms (e.g., advertising agencies) and client firms (e.g., advertisers). His research indicates that the career mobility of individuals in both organizations is intertwined with the continuity of their market ties. Staffing changes in either firm through exit or promotion can impact inter-firm relationships both positively and negatively.

For client firms, the departure of marketing managers increases the odds that the partnership will dissolve because marketing managers serve as the principal point of contact between the two firms and play key roles in keeping the relationship together. The promotion of these managers, however, did not disrupt ties as Broschak expected, leading him to conclude that "social embeddedness, once established, doesn't weaken when managers change jobs, only when they exit a firm."

For advertising agencies, the story is somewhat similar. Agencies lose more clients when staff members who manage relationships leave or are promoted. Thus any kind of mobility of account managers can have deleterious effects on an agency's ability to maintain market relationships. However, unexpectedly, Broschak's 2001 research revealed that the exit or promotion of creative staff appears to strengthen client-agency ties rather than weaken them. Agencies lose fewer clients following the exit or promotion of creative managers. He postulates that this is due to relieving the conflicting interests of agency creative staff and client marketing managers, creative staff have a tendency to be interested in advertising as a product, while clients are interested in advertising's effects on sales. This inherent tension makes some clients more ready to accept a new creative face in a relationship.

Interestingly, a 2004 analysis by Broschak on the same dataset exploring dyadic (two party) relationships rather than the overall portfolio of relationships revealed that the loss of creative personnel can have a negative impact. Additional study is needed to better understand why creative managers have a strong impact on specific relationships but a lesser impact on the general set of client-agency relationships.

Time works in favor of continuing relationships. Familiarity between exchange partners, which comes with time, makes relationships easier to coordinate and lowers the probability of their dissolution. The balance of market power between exchange partners also has an impact: the more unbalanced a relationship, the more difficult the interactions become because one player can make greater demands on the other.

The impact of mobility also varies with the characteristics of firms, says Broschak. For example, the departure of marketing managers has a pronounced effect for a large firm but little impact on a small one. For agencies, the disruptive effects of manager mobility decrease with the number of client relationships the firm maintains.

Systemwide Impact

Research by Broschak and others has determined that employee turnover can damage relationships between firms by changing the dynamics of those relationships. Exit and promotion also have an impact because of the effort and time required to locate and train new employees--time and effort that takes attention away from a firm's clients or service providers. Even more time is needed for newly hired individuals to gain experience and develop their own networks of interpersonal relationships.

Broschak says too often companies only look at the internal impact of staffing changes. In some cases, focusing internally can be a mistake. Firms should also consider the ripple effect of staffing changes on their suppliers and customers. To lessen the impact of negative outcomes, he suggests that firms consider ways to prevent turnover by making staff retention a priority. Another strategy for service providers is to establish firm-level relationships with clients in addition to the individual relationships. Depending on the service, a company might, for example, provide customized reports or interface billing or accounting systems. These firm-level investments might lessen the impact of an individual's departure.

"It's important for managers to continually think about the consequences of what goes on inside their firms for the people who are outside their firms," he advises. "The people who work directly with clients or suppliers are important because they are the ones who make investments in their firms' relationships."

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Joseph Broschak earned a BS in petroleum engineering from the Pennsylvania State University, an M BA from the Fuqua School of Business at Duke, and a PhD in management from the University of Texas at Austin. An assistant professor of organizational behavior, Broschak's research interests include the use of nonstandard work arrangements, mobility in professional and managerial labor markets, and organizational demography.
It is no secret that Social Security’s finances are not sustainable. This is primarily because a major demographic shift is adversely affecting Social Security’s balance between taxes and expenditures, says Jeffrey Brown, assistant professor of finance and a former senior economist with the White House Council of Economic Advisers.

“Social Security is not a savings system,” says Brown. “Rather, it is an income transfer system designed to tax today’s workers to pay today’s retirees. That works really well if you have lots of workers and few retirees. It doesn’t work very well when you have a small number of workers supporting each retiree.”

As baby boomers begin to retire, the ranks of retirees will swell, while the ranks of workers will stay the same or even shrink. This means the ratio of workers paying into the system for each retiree receiving benefits has steadily dwindled. For example, in 1960 there were more than five workers paying taxes to support each beneficiary. Today there are only 3.3 workers paying taxes to support Social Security for each person receiving benefits.

Given the likelihood that life expectancy will continue to increase (i.e., retirees will collect Social Security for longer periods of time) and birthrates will continue to decline, demographers predict that this ratio will continue its downward trend, reaching a level of two workers for every retiree within the next 40 years.

Consider all these factors together and it’s easy to understand why Social Security will start paying out more money than it collects in taxes by about 2018. “The way our public pension system is structured, it is not particularly resilient to those types of demographic changes,” says Brown, whose work with the White House Council of Economic Advisers focused on Social Security issues. “Social Security faces severe long-term financial problems. It’s clear something has to be done to fix the system. The big debate is whether or not we should also use this opportunity to change the nature of the system to include an element of individual asset ownership or keep it as strictly an income-based-transfer system.”

Improving the System

Brown believes there are ways to both fix the existing Social Security system and change the nature of that system. “We can do more than just save Social Security,” he proclaims. “We can improve it.”

Brown notes that Social Security benefits are scheduled to increase faster than the rate of inflation, so future retirees will be getting greater benefits in real dollars than current retirees, further straining the system.

“By simply slowing the growth rate of benefits so that future retirees get the same inflation-adjusted benefit as today’s retirees, Social Security can live permanently within its means without raising payroll taxes,” says Brown.
In addition, he advocates the option of putting part of an individual's payroll taxes into individual retirement accounts. "While the basic approach to financing Social Security has not changed in the seven decades since its inception, the economy of the 21st century is very different from that of the 1930s," says Brown. "Countless technological advances have improved our lives, people are living longer than ever, women have entered the labor force in record numbers, and there's a vast array of new financial products. It's time that we update Social Security to reflect these developments."

Based on research that suggests that high taxes can provide a disincentive to work, Brown suggests that, likewise, having control over some part of one's payroll taxes may give people more incentive to work. In addition, these individual accounts would create a system through which our nation can save more for the future. However, talk of "privatizing" Social Security is misleading, notes Brown. "It's not like we'd be shutting down the system and leaving people on their own," he says. "Individuals would still receive a base level of traditional Social Security benefits. As for the accounts, we're talking about a government-sponsored pension system where people are allowed to choose from among a set of diversified investment options, but the accounts are still centrally administered by the government. This system will keep costs low and will ensure that people save the money for retirement rather than spending it on other things."

Brown points out that this is not such a radical plan. "There are two dozen other countries that have done this in the past two decades," he says, including the United Kingdom, the Netherlands, Chile, and Switzerland.

And while Brown is correcting misperceptions, he points out that "today's seniors have nothing to worry about. Even if you are a decade away from retirement, no one is going to mess with your benefits," says Brown. "It is the younger generations, the college students I teach, for example, who have the most at stake and need to pay attention to the discussions and to the decisions being made today."

Research with Real-World Applications

Although Brown, who has a master's degree in public policy from Harvard and a doctorate in economics from MIT, has been asked to lend his expertise to several public policy organizations, academic research is his first love. His work with the White House Council of Economic Advisers and on the staff of the President's Commission to Strengthen Social Security has been an outgrowth of his research, not the other way around.

Brown, who was an assistant professor of public policy at Harvard University before coming to the University of Illinois, has published research on such topics as how individuals make personal financial decisions in the presence of uncertainty about health care expenditures and length of life, and whether the Internet makes markets more competitive, with a focus on the life insurance industry.

Some of Brown's other research has investigated what individual Social Security retirement accounts might look like. Together with his College of Business

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Show Me the Money

**What can you expect in Social Security benefits?** Each year the Social Security Administration sends automatic statements to workers and former workers 25 years and older. The statement is a personal record of the earnings on which you have paid Social Security taxes during your working years and a summary of the estimated benefits you and your family may receive as a result of those earnings. The Social Security website (www.ssa.gov) also includes a benefit calculator that estimates potential benefits using different retirement dates and different levels of potential future earnings.

And if you want a rough first estimate of the total amount of money you'll need for retirement, the American Savings Education Council has a planning tool to assist you. The Ballpark Estimate Worksheet assumes that you'll need 70 percent of current income, that you'll live to age 87, and that you'll realize a constant real rate of return of 3 percent after inflation. The worksheet allows for modification of life expectancy and investment return. Visit www.asec.org/ballpark/index.htm to print out a worksheet or complete an online version.
colleague Scott Weisbenner, assistant professor of finance, Brown hand collected data from almost 800 firms that filed details of their 401(k) plans with the Securities and Exchange Commission. That data, which spans the 1990s, included what funds were offered and what contribution choices employees made.

Brown and Weisbenner asked questions like: When a firm changes its mix of investment options, how do people respond? Do they make purely rational choices or does the design of the plan influence their behavior? They found that if, for example, a company offered two stock funds and two bond funds, employees put some contributions in each and had a balanced account. If the company added, say, two more stock funds, even though there was no reason to change the overall mix of stocks and bonds, people tended to then put a much higher fraction of their contributions in stocks, since there were more stock choices.

“So the choice of what funds and what mix of funds to offer really influences people’s portfolio choices,” says Brown.

This research shows how important investment plan design is in influencing people’s portfolio allocations. That information helps economists and policy makers understand how people might operate if they had individual accounts in Social Security.

“This research is interesting to the academic community because we learn about individual portfolio behavior,” says Brown, “but it’s also really useful to policy makers because it shows why it better not just be an afterthought about what funds you’re going to offer.”

Demographic shifts that impact Social Security funding aren’t the only factors altering the retirement landscape. Another significant change is the phasing out of traditional corporate defined-benefit pension plans and the increased reliance on 401(k)s or other defined-contribution retirement accounts.

Like Social Security, traditional defined-benefit plans pay retirees a fixed amount every month as long as they live. These plans grew in popularity after World War II and were the dominant form of corporate pension plan through the 1970s. However, in the wake of some high-profile corporate bankruptcies during the 1960s, in which many pensioners lost nearly everything, Congress passed the Employee Retirement Income Security Act in 1974. While the intent of the Act was to provide greater protection to workers and pensioners, the rules also imposed a regulatory burden on companies. Companies, in turn, tried to reduce that burden. For this, among many other reasons, defined-contribution plans became more popular with employers. Defined-contribution plans are also popular with employees because they typically offer more investment choice, are easier to understand, and are more portable when individuals change jobs.

But, unlike Social Security and defined-benefit pensions, most defined-contribution plans provide a lump sum of money upon retirement that the retiree needs to manage in order to have enough to live on. The problem, says Jeffrey Brown, assistant professor of finance, is that you can’t determine at what rate you can spend your retirement savings and not run out. If you calculate how much money you’ll need if you live until, say 90, but then you have the bad manners to live until you’re 95, where does that leave you?

“People often fail to appreciate the financial implications of not knowing how long they’re going to live,” says Brown.

For managing the financial uncertainty that arises from not knowing how long one will live, Brown recommends increased use of life annuities, financial products that workers can pay into that guarantee an income for life, much like a pension or Social Security does. Basically, life annuities are insurance products that pool resources across a large number of annuity buyers. “These products essentially use the resources of those who die earlier than expected to pay higher benefits to those who live longer than expected,” says Brown.

Although the concept has been around since ancient Greece, not a lot of people make use of them. Brown has no single explanation for this, but some of his research is delving into why there is not a bigger market for life annuities and whether that market might develop if individual Social Security accounts do become a reality.

To learn more about Brown’s research on life annuities, Social Security, and retirement financing, visit www.business.uiuc.edu/jbrown/Publications.htm.
Although not everyone remembers it, there was a time when cashiers had to manually enter the price of every item purchased by a customer and distributors had to actually count the products on the pallets. All that changed in the 1970s with the introduction of automatic identification (auto-ID) technology, such as bar codes, which dramatically altered product identification through the creation of an automatic scanning system. Now, 30 years later, manufacturers, distributors, and retailers are set to ride a new wave of technology that promises to revolutionize the face of the supply chain.

Radio frequency identification, or RFID, is an automatic identification system that uses radio waves to capture information. The system consists of an RFID tag, made of a silicon chip and an antenna, and a wireless receiver that converts waves into digital data. Unlike bar codes, which must be scanned manually and read individually, RFID tags do not need to be within the line of sight of the receiver to be read. In fact, it is possible for hundreds of tags to be read each second, even through snow, ice, paint, and other visually or environmentally challenging conditions, as long as they are within the field of the wireless receiver.

What the Technology Can Do

RFID is a proven technology that has been used for years by the government to track livestock and nuclear material. The airline industry and the FAA use it to route baggage and increase security, and commercial industries deliver packages and monitor highway tolls with the help of RFID.

In 1999 the Auto-ID Center at MIT was established to explore the opportunities for integrating RFID technology into the supply chain. Their researchers recommended placing an electronic product code (EPC), a kind of serial number, in the microchip on each RFID tag. The EPC provides unique identification for every inventoried item as opposed to identifying only the manufacturer and class of products, as bar codes do. And because the receiver can read the information through plastic and other such materials, the tags can be embedded in packaging or encased in protective plastic for weatherproofing and greater durability. When the tags are placed on crates, pallets, cartons, or individual products as they enter the supply chain, their progress can be automatically tracked all the way to retail shelves and through cash register lines.

This technology allows companies to accurately and quickly identify items, capture information about their location, their history, and their numbers in the supply chain, and then store that information on a computer automatically. Such efficiency enables organizations to focus employees on more value-added functions, such as customer service. Plus, the information captured by the system allows the organization to be more responsive to customers and consumer needs.

The Competitive Advantage

The information RFID tags can provide and the ease with which that information can be accessed has the potential to save companies billions of dollars in lost, stolen, or wasted products. For instance, it could be used to alert stores to restock groceries or medicines when they have reached their expiration dates. The system's ability to more accurately manage inventory could also lead to increased sales by preventing out-of-stock merchandise and reducing the incidence of obsolete or outdated products.

Such opportunities to improve business processes are turning the heads of many large retailers. Industry giant Wal-M art, for instance, recognizing the competitive advantage provided by RFID, required its top 100 vendors to use the technology at the case level beginning January 1, 2005. Indications are that all 100 suppliers met this requirement in at least one product category and that another 37 vendors have voluntarily agreed to comply. In addition to Wal-M art, Gillette, Procter & Gamble, and Coca-Cola have taken the lead in researching and investing in RFID.

The cost of such investments has been one of the reasons why RFID technology, though available for decades, has not been widely used. The $1,000 expense of an RFID reader and the 20-cent cost of an individual tag make it impractical for a company to purchase the thousands of readers needed to cover all their locations and the millions of tags needed for all their products. As costs continue to decrease and the value of RFID becomes clear, experts predict widespread adoption of this technology before the end of the decade.

RFID Research in the Classroom

Courses in the College of Business are providing opportunities for students to research the value and implementation of RFID. Suman Mallik, assistant professor of operations management, teaches RFID along with other supply chain technologies in his business administration classes. Last spring, he invited a Wal-M art executive to visit his MBA class to...
discuss RFID and its impact on the company.

Students in the Industrial Distribution Management program are also being prepared for the emergence of RFID. In the fall semester, the senior practicum project focused on the impact and role of RFID in monitoring security in the food supply chain. The seniors’ projects provided background for a cross-campus research team studying the integrity and safety of the nation’s food system.

The IDM case competition, to be held this spring, will also give students firsthand experience in tackling the business issues related to RFID implementation. Their challenge will be to improve the efficiency of a manufacturing facility through the adoption of RFID technology.

Improvements Across the Supply Chain
According to William Qualls, professor of business administration and director of the Industrial Distribution Management program, RFID represents an opportunity for all the players in the supply chain. “The ability to monitor, trace, and track product inventory throughout any phase of the supply chain will increase efficiency, productivity, and security for all channel members,” he says. “By accessing and sharing information in real time, the axiom of having the right product, at the right place, at the right time will be realized.”

For manufacturers, it will also mean improving quality control by automatically checking in all the components used in the assembly of a product as they are delivered. At distribution centers, it will mean efficient loading and unloading because RFID readers will automatically count the products rather than employees taking the time to scan bar codes.

Of course, with any opportunity there come challenges as well. Managers must consider the timing and financial implications of implementing RFID. For instance, what are the risks and rewards of employing the technology early on rather than waiting for more widespread use? What are the costs beyond the actual RFID equipment itself? What are the potential expenses for retraining personnel or upgrading existing information systems to handle the data captured by an RFID system?

The Privacy Challenge
Though the entire supply chain would be affected by the widespread adoption of RFID, it is the retail environment where there is the greatest potential for change—and for opposition. While retailers see opportunities for RFID to provide better inventory forecasting, improve product rotation practices, and assist with inventory allocation, they are already feeling the heat of those who see RFID as the point-of-purchase Big Brother.

Some consumer groups and legislators believe that consumer privacy is compromised by the technology and are working to ensure that tags do not remain in products as they leave the store with customers. Those concerned about privacy may see the value of the technology at the pallet or carton levels, but they argue that the technology should track the product—not the people who buy it. Therefore, they are pushing for standards that would require that tags not be embedded in the packaging of individual products.

This debate, and its implications for broader implementation of RFID technology, warrants monitoring by all members of the supply chain. According to Mallik, “The impact of RFID will be huge in the next five years provided the cost of RFID tags comes down and the privacy concerns of the consumer groups are solved.”

- Cathy Lockman
For many college students, an internship can be little more than an intensive lesson in Errand Running 101. But for seniors Frankie Kazas and Tarun Puri, the experience was far different. As interns in the Industrial Distribution Management program, the students found themselves immediately immersed in the projects of their host companies—Kazas at Caterpillar in Morton, and Puri at Alaris Consulting in Oakbrook.

The ten weeks that Kazas spent in Caterpillar Distribution Services exposed him to a number of opportunities for hands-on experience. One of the projects he assisted with involved expediting 4,400 parts that were stalled at the Mexican border. To prevent Caterpillar from further economic loss, Kazas worked with his team by collating data from different team members’ databases and formatting this data into the proper form for the Mexican customs.

While at Caterpillar, Kazas also received Six Sigma training, where he learned project management techniques dealing with expense reduction for Caterpillar’s warehouse network. Training as a Green Belt, Kazas was guided by a Black Belt on a data gathering and analysis project. Although he was not eligible for Green Belt certification as an intern, his experience provided a good introduction to the system.

Although Six Sigma training was not a part of Puri’s experience at Alaris Consulting, he was able to discover savings of a different nature. Working with the transportation network of a leading office manufacturer, the internship project component of Puri’s job involved finding a way to better coordinate outbound and inbound shipments. An outbound shipment typically carried a load only one way and traveled empty (or dead-headed) on the return trip. By creating a back-haul analysis report, he coordinated inbound shipments from each outbound destination. Puri tracked the number of dead-head trucks traveling the same routes, as either inbound or outbound shipments, and made recommendations that combined two separate trips into one. By eliminating unnecessary trips, the company could realize significant cost savings. In addition to this work, Puri also had responsibilities to a project team, performing data analysis and documenting negotiations between clients and suppliers.

Both Puri and Kazas welcomed the chance to use their problem-solving skills in a real-world situation and credit their internship experience with laying the foundation for careers in supply chain consulting. “Being in a small consulting firm and being a part of such a large project gave me a diverse range of experience in terms of accountability and responsibility to the team,” Puri said. Kazas expressed similar feelings about his internship with Caterpillar. “At Caterpillar, I was able to experience a distribution network that has been in place for 80 years and consequently is very stable and reliable. It will give me a model to go back to when doing consulting work for other companies with sub-optimal supply chains.”
Way Beyond the Dewey Decimal System

The Business & Economics Library Provides Tools for World-Class Research

When Melville Dewey conceived of his now-famous classification system in 1873, it provided a needed structure for the organization of library collections. More than 130 years and 220,000 libraries later, it certainly is a system that's stood the test of time. But as the resources in today's libraries have changed, so has their patrons' reliance on Dewey's system and the old card catalog.

It's certainly true for students and faculty who use the Business & Economics Library (BEL). With more than 60 databases, a bank of 16 computers, 4 Biznet workstations, and a Bloomberg terminal at their disposal, BEL patrons have a wealth of tools to assist them in researching a wide variety of business subjects from real-time financial data to local market consumer information. These tools and the staff who teach users how to make the most of them provide a real advantage to Illinois students and faculty.

Just ask Brian Henderson, a doctoral student in finance, who is working on research in international finance and convertible bonds. “My research requires extensive use of financial databases,” he says. “I would be lost without access to the Bloomberg terminal and without the help of the library staff. They're knowledgeable about the resources and know how to help you to get the database to give you what you want, which is the key to successfully navigating through information.”

Becky Smith, associate professor of library administration and BEL librarian, and Yoo-Seong Song, assistant professor of library administration and BEL librarian, assist finance PhD student Brian Henderson.

The Business of Information Navigation

Assisting users in successful information navigation is one goal of the library's staff. But first the information must be available. That’s where the databases and the College’s commitment to providing them come in.
When Becky Smith, associate professor and head of the Business & Economics Library, came to Illinois four years ago, there were 20 databases from which information could be accessed. Today, that number has more than tripled.

“We need to be able to change with the needs of our community of users and to be proactive in seeking out the resources they need for their research efforts,” says Smith. Currently, only a small fraction of the material ordered by the library is print. Those materials are well used, but they represent only about 4 percent of the total money spent on scholarly resources. “The overwhelming majority of users are asking for online resources and that’s what we’re seeking to provide,” she says.

Henderson appreciates the user-focused philosophy. “The staff advocates for those of us conducting research by being persistent in getting new resources in order to meet the needs of the users.”

It’s a task that taps the “business” in the business librarian. Smith must investigate users’ requests for online tools, evaluate the needs of the user population, find options, and assess costs. “For online resources, I examine how agile and user friendly the database is, how many people will use it, what it costs, what format it’s available in, and how broad a scholarly appeal it has. When possible, I will request a trial online subscription to the database. The final step is to negotiate a good contract.”

Learning by Example

Once the database subscriptions are purchased, the real work begins—teaching people how to use them. Most of that responsibility falls to the library’s staff of two faculty and five full-time professionals, who are assisted by sixteen student workers.

“Our goal is to be ‘learning enablers,’” says Smith. “We want to turn the users into information searchers so they know how to find the information themselves or they know how to ask the questions that will result in the right information.”

And for those users who want to try their hand at learning to use certain databases on their own, the library has another option—online tutorials. By visiting the library’s website, www.library.uiuc.edu/bel, students and staff can walk step by step through the process of accessing several online databases.

The tutorials are a learning tool not just for those who use them. “This is a mutually beneficial project,” says Smith. “It provides the graduate students who write the tutorials with practical, hands-on learning experience, while assisting our users at the same time.”

Bringing the Library to the User

Online tutorials are just one of the many ways library resources can be used without even setting foot inside Room 101 of the Main Library, which is the BEL’s home. The library’s website provides users with access to selected business databases, business e-journals, class resources, as well as links to other Internet resources needed for business research. “The biggest issue in the business information landscape is bringing the library to the user,” says Smith.

Tim Babbitt, assistant professor of business administration, agrees. In fact, he says bringing the library to the user may well be the biggest information innovation since the photocopier. Before that invention, you had to go to the library, find the article, take notes, and return it to the library.

“People take it for granted now, but it really changed things when you could make a copy and keep it for yourself,” Babbitt says. “Databases take that to another level. You can now have your own copy on your computer. You don’t even have to go to the library. The next iteration is that you can share the article by providing a link to it.”

Exploring Linkages

Babbitt is embarking on just such a project for the College of Business, as he develops a database that will make it easier to access research of business faculty members. And he’s doing it with a little help from the BEL staff.

The idea began three years ago, when he developed a data-driven website for the Department of Business Administration. From that idea came the goal of developing a database that would allow users to click on a faculty member’s name, view a list of that person’s research, and, with the appropriate legal access, link directly to a copy of the research. It would also be user-friendly so that faculty could easily update their research results and publications.

Because the idea is so closely linked to online journal resources, Babbitt has found collaboration with the library to be especially helpful. “It’s important in this project to be aware of the trends in library circles and the legal issues, and the library has provided valuable information on these topics,” he says. “If you don’t know where an industry is headed, it’s difficult to link up to it.”

A System That Works

“Linking up” is how the library meets its mission of bringing the library to the user. Online delivery of resources and services is one obvious strategy. Personal linkages are another.

That’s why the library staff is willing to take their show on the road. Library faculty members conduct workshops for doctoral students and visit business classes to make presentations to students on the resources available and how to make the most of them. They also organize career workshops, encouraging students to use the library to find information on the industries and companies they’re considering for employment opportunities. And always the parting comment is the same: “When you need help, ask a librarian.”

Every day scores of business students, faculty, and staff take them up on their offer. Like Dewey’s system, such an approach is bound to stand the test of time.

- Cathy Lockman
They don’t call the initial phase of product development “fuzzy” for nothing. There are few times in the process where the path is less clear and the need for information more intense than during the so-called “fuzzy front end.” And because data gathering and retrieval remains critical during the later stages as well, information management systems play a key role in the successful development of new products.

On average, new products represent 35 percent of sales by business-to-business (B2B) firms, and yet nearly 40 percent of all new products fail. So the stakes are high. Sales force automation software, data warehouses, and data mining applications have vastly increased the amount of information available to product developers and simplified its manipulation and use. However, current applications focus attention on increasing sales of existing products and services rather than developing new products.

Abbie Griffin, professor of business administration, along with colleagues Debra Zahay and Elisa Fredericks of Northern Illinois University, studied the information needs of businesses at various stages of product development. Their research, “Sources, Uses, and Forms of Data in the New Product Development Process,” appeared in the October 4, 2004 issue of Industrial Marketing Management and is the first in a series of studies examining the role that knowledge management plays in new product development.

A Systematic Approach

At the 2002 Product Development & Management Association Conference, the researchers conducted in-depth interviews with 14 product developers and 6 product development software vendors. They focused on B2B firms because such product development is typically more complex and takes longer than the process followed for consumer-oriented firms. Product developers were asked about their firms’ new product development process, what information was necessary, and how information about customers’ needs and wants is gathered and managed. Vendor interviews explored the capabilities, mechanics, and possible deficiencies of their systems.

The project began with the goal of understanding how customer information can be used. However, during the interviews it became clear that the new product development process requires many kinds of information and that identifying and categorizing the information would have to be the first step in determining how it can be used.

The interviews identified eight information types and how each is developed. Strategic, financial, and project management information is developed internally; competitive and regulatory information is externally developed; and customer, technical, and needs and wants information is a combination of both. The accompanying chart details where in the new product development process each of these eight information types is used.

Managing Information Throughout the Process

The fuzzy front end is the most information-intensive part of the process. The information developed during this phase is used to reduce uncertainty. It is important for firms at this stage to ensure that all of the team members take the same meaning from the data they use—that is, that the information is mutually comprehensible. Firms must also retain the richness of the information by including not only quantitative data but also more descriptive information from video, audio, and artifact data. It is also critical that firms determine how to structure a system that melds the market-size and financial and project management data, for example, with the rich data of customer needs. Firms
that cannot manage information across projects over time may find that they have the most difficulties in managing the initial stages of product development effectively.

Information in the development stage is more focused, centering on reducing uncertainties about customer needs (What do they want?) and technical issues (Can we do it?). A difficulty that can arise at this stage is that engineers involved with the technical side of development speak a different language than the marketers, who may be responsible for the detailed investigation of needs. Needs information is likely to come in diverse forms and must be obtained from outside the firm, while technical data will most likely be quantitative and will primarily be developed within the firm. The challenge of the information management system is to assimilate the different types of information from different sources and to ensure mutual comprehension among all of the members of the new product development team.

The breadth of information types in the testing and validation stages of development reflects a broader set of uncertainties that must be resolved. Mutual comprehension must be assured across a broader base of team members. However, management of information may be easier at this stage because more of the data will be quantitative and accessed from datasets and databases.

The only uncertainties being managed in the final stage of commercialization are the “who is our customer” and “how are we tracking against our project management.” This kind of information is inherently more comprehensible to all players and can easily be captured in an information system.

Of the firms studied, only a few companies use many types of information gathered from a variety of sources within the firm in their processes. These successful firms consolidated the data, made it accessible, and shared it throughout the organization. They had a directed vision of how to manage information, including all types of customer information, in order to administer and support the process of new product development.

Challenges for the Vendors

The research found that no vendor system was capable of managing all data forms. Most systems focus on project management and use quantitative information. A few also allow teams to attach documents to project information. Text-tagging and search engines are beginning to improve text management; however, some systems do not provide the means to search throughout all the documents in the system. The most difficult information forms to incorporate into new product development in a structured and consistent way are the rich data - video, audio, and artifact data.

None of the systems were developed with an eye to the full set of uncertainties that need to be reduced throughout the product-development process. Because of this limitation, ensuring mutual comprehension has not been designed into the systems. It would appear that the two most demanding stages of product development are the fuzzy front end and the development phases, and the needs of these two stages differ slightly. Thus, firms developing information management systems need to ensure that their systems meet the needs of both of these stages.

--- Janet Fitch

Abbie Griffin, professor of business administration, earned a BS in chemical engineering from Purdue University, an MBA from Harvard, and a PhD from MIT. Prior to joining the Illinois faculty in 1997, she was an associate professor at the University of Chicago's Graduate School of Business. Griffin teaches introductory marketing and business-to-business marketing to MBA students. Her research investigates ways to measure and improve the process of new product development.

Fact File

- An average of 40 percent of all new products fail.
- New product development for B2B firms is typically more complex and takes longer than for consumer firms.
- Eight different types of information are needed during product development: strategic, financial, project management, technical, competitive, regulatory, wants and needs, and customer information.
- The most difficult information forms to incorporate into new product development in a structured and consistent way are the rich data - video, audio, and artifact data.
Today's hot fashion item can be tomorrow's fashion faux pas. The quick pace and changing styles of the apparel industry can mean a short shelf life for shirts, shoes, jackets, and pants— and a large overstock for retailers. But by pursuing creative and flexible inventory management strategies, retailers can find new ways to handle overflowing shelves.

Nicholas Petruzzi and George Monahan of the Department of Business Administration have studied how the proliferation of outlet stores, both at the mall and online, have provided an accessible secondary market for the sale of excess fashion inventory, such as shoes, clothing, linens, luggage, and home accessories. Why the need to rely on a secondary market? The nature of the retail system requires that buyers typically make their original purchases well before the selling season. Forecasts of demand are not very reliable at that time, which opens the door to inaccurate predictions and overstock possibilities.

There are several strategies that retailers can employ to cope with inaccuracies in demand forecasts. One common strategy, of course, is to mark down the price of items that are moving slowly to increase customer interest. A second strategy, which can be implemented before the season begins, is for the retailer to negotiate purchases that provide it with alternatives for postponement. Postponement is a strategy in which the buyer (i.e., the retailer) has the flexibility to place a tentative order with a supplier while retaining the right to adjust it later when more accurate market information becomes available. Of course, delaying the placement of an order would have the same effect.

The Salvage Option Strategy

Petruzzi and Monahan have studied a third strategy. They analyzed the problem from the perspective of a retailer who has the option to salvage its inventory by selling it in a secondary market. The retailer can sell to the outlet store if, at any time during the season, it determines that the demand from its fashion-conscious customers in the primary market does not warrant continued stocking of the selected item.

The two researchers focused on two questions. First, what is an optimal strategy for determining whether an item is a "winner" that should remain on the retailer's shelf or a "loser" that should be salvaged through outlet stores? And second, what implications does such an optimal strategy have on the retailer's original decision to purchase? They created a model in which a retailer has only one opportunity to purchase goods before the season, which is made up of multiple periods. At the end of each
period in the season, any inventory remaining incurs a holding cost to the retailer (for storage, the lost ability to stock more popular items, etc.). Then, based on the current and cumulative demand to date, the retailer decides either to sell the remaining inventory of an item to a secondary market or to extend sales of the item into another period, at the end of which the decision process recurs.

In effect, the flexibility to sell off excess inventory of items that the retailer concludes are “losers” decreases the costs for holding the items since the retailer can cut its losses by selling the excess inventory to a secondary market earlier, rather than letting inventory costs continue to accrue until the end of the season before finally dumping the items.

The Value of Marketing and Operations Coordination

When the retailer’s marketing department is given the task of setting sales quotas and its operations unit is responsible for purchasing stock to be sold, the decisions are made sequentially rather than being coordinated. According to Petruzzi and Monahan, this strategy can be problematic because it means the operations department chooses stock without considering the effects of sales quotas. Marketing then sets sales quotas in response to the stock chosen. In such a scenario, say the researchers, operations will purchase too little stock and marketing will respond by setting sales targets too low. Thus, the retailer may hold on to stocks of “loser” goods too long.

Coordination between procurement and marketing strategies offers a solution to this problem. According to Petruzzi and Monahan, the optimum strategy requires that a sequence of time-dependent sales targets be established. In each period, the cumulative sales to date are compared to that period’s sales target. If cumulative sales to date are less than the target, all the remaining stock is sold to the secondary market and the primary market shuts down; otherwise, the primary market stays open for at least one more period. The researchers further demonstrate that the sales targets are larger when the amount originally procured is larger and that retailers who have the opportunity to follow the proposed “flexible” salvage strategy should purchase larger quantities from the supplier.

Additional Inventory Management Solutions

The Petruzzi-Monahan model could also be used as a basis for analyzing various issues regarding the supply chain. For example, it could be used to investigate whether or not the retailer’s supplier should consider offering an “anytime” returns policy, one in which the retailer would be allowed to return any unused stock at any time to the supplier for a pre-specified per-unit credit. Thus, the supplier, rather than the outlet store, becomes the salvage option. The supplier’s problem would be to determine the right return credit to quote to the retailer prior to the sale.

Solutions to these and other inventory management problems require creative strategies on the part of retailers and suppliers. By exploring flexible salvage options and coordinating marketing and procurement functions, retailers can minimize bad buying decisions – and the fashion overstock that results from them – and maximize profitability.

- Janet Fitch

Fact File

- By coordinating marketing and procurement functions, retailers can make more accurate sales projections and more effective buying decisions.
- Overstocking occurs because retailers make their buying decisions well before the selling season.
- Outlet stores help retailers salvage their inventory and decrease their holding costs.
- Retailers should establish a sequence of time-dependent sales targets and sell stock to outlet stores the first time a target is not met.
Research has shown that buyers are not very accurate when recalling the price of a product even seconds after the product has been selected. That result was intriguing, and we have proposed that the issue is not what they can explicitly recall or remember but rather what they sense or know about whether a specific price is or is not what they had previously seen. A considerable amount of the processing of numerical information is automatic and non-conscious. Thus, explicitly remembering a price may not be a good indicator of what buyers implicitly know. Price information not consciously remembered can still influence internal reference prices and the range of acceptable prices we establish for different products and services.

Another important finding is that we are all hardwired at birth with a mental number line that is logarithmic. This mental number line influences how we process numbers – and, therefore, prices. For instance, research indicates that we process even numbers more quickly than odd, that we have more difficulty distinguishing between larger numbers like 6, 7, and 8 than we do with 1, 2, and 3, and that the number 9 is the most difficult number for us to process. Our perceptions about prices follow this logarithmic relationship as well.

Kent Monroe is the John M. Jones Professor of Marketing in the Department of Business Administration. He received his DBA from the University of Illinois in 1968 and was a faculty member at the University of Massachusetts and Virginia Polytechnic Institute and State University before joining the University of Illinois faculty in 1991. A pioneer in research on understanding how buyers perceive price information and form value judgments, Monroe teaches courses and conducts research in pricing, marketing strategy, and marketing research. His executive training programs on pricing strategy have been delivered on six continents.

Monroe, who was recently named the American Marketing Association’s Distinguished Marketing Educator for 2005, will be retiring from the University this summer. He plans to move to Richmond, Virginia, to spend more time with his children and grandchildren and to continue his behavioral pricing research and consulting work in pricing strategy.
What are the most common mistakes companies make when developing pricing strategies?

Nearly 80 percent of firms today look at prices more as a way to recover costs rather than as a way to generate revenues. They base price setting on annual budgeting exercises and misunderstand how buyers perceive price differences and form value judgments. More firms need to shift away from a cost recovery mindset and toward a revenue management approach. This new way of thinking challenges firms to focus on what the customer wants rather than on the company's internal needs. The focus becomes seeking to understand how customers perceive value, and then developing their pricing and marketing programs to provide that value.

Less than 15 percent of all companies do serious pricing research before developing and implementing a pricing strategy. Without information on how customers form value judgments, managers can't understand their customers' perceptions of prices, price changes, and price differences. EuroDisney provides an example. When the park opened in 1992, prices were set at 250 francs to cover costs. By 1994, losses were averaging over $1 million a day, so prior to the 1995 opening a market research survey was conducted. The survey found that French consumers were unwilling to spend more than 200 francs for a single adult ticket. When management acted on this information by lowering prices to 195 francs, the park began operating at a profit and, by 1996, 40 percent of the visitors were French.

By instituting a proactive pricing strategy, companies can minimize mistakes. Such a strategy requires that a firm (1) research the pricing environment, (2) recognize that strategic pricing decisions define an organization's value image in the eyes of customers and competitors, and (3) understand that tactical pricing decisions must be made within the firm's overall pricing strategy.

What innovations are on the horizon and how will they impact pricing and profitability?

Advances in information technology are changing the way companies think about pricing. The ability to systematically collect and accurately analyze the right information is the key to making good pricing decisions. New software developments make this collection and analysis much easier and help companies understand the nature of the price-demand relationships for their offerings. Such information systems are a major innovation and can have important implications for profitability, but only if management consistently uses the information when making their decisions. The Internet is also having a significant impact.

During your more than 30 years as a marketing professor and researcher, what have been the most significant changes to occur in pricing practices and research?

When I was a doctoral student at Illinois, I was intrigued by the idea of exploring the psychological dimension to consumer behavior as it relates to prices, and I pursued that path in my research. I didn't know at the time that it was an area that was largely unexplored. It has provided me with an opportunity to play an important role in developing this field of study since those early years.

During this period of time, the most obvious changes in research have come in the actual volume of work being done in the field of pricing. I have a large filing cabinet overflowing with articles dating back to the 1960s. A recent review of the material in the cabinet revealed very few articles from before 1985 and only slightly more from before 1990. Most of the work in this field has occurred in the last 15 years. This recent research focuses on how people process price and make judgments, which is a significant change from the neoclassical approach that was more prevalent when I first began my work in the field. This area of marketing continues to be full of opportunities for innovative research.

A significant change in pricing practices during this time has been the sellers' growing reliance on fees as part of their pricing strategy. You don't need to look much further than your phone bill or a rental car invoice to see what I mean. Imposing fees is certainly one way to generate revenues; however, for this practice to be effective, firms must clearly communicate the fee structure to their customers. By making the prices more transparent -- that is, by explaining the reasons behind a pricing strategy -- a firm has the opportunity to establish a value for the service in the customer's mind. When customers do not understand how and why prices are set, they may perceive that the prices are unfair. Such perceptions of unfairness reduce their perceptions of value. And these perceptions of value are critical to establishing successful relationships with customers.

“Perceptions of unfairness reduce perceptions of value, and perceptions of value are critical to establishing successful relationships with customers.”

Editor's Note:
4 for 4 is a regular feature of Perspectives, which allows us to catch up with College newsmakers. We pose four questions and share the answers here.
Microsoft Computing Grant Awarded to Shaw

Michael Shaw is one of ten faculty members across the country who have been chosen by Microsoft Corp. to develop courses that introduce students to the concept of trustworthy computing. Shaw proposed a graduate course covering the four areas of this developing field: security, privacy, reliability, and business integrity. His grant, awarded in December 2004, is for $50,000.

In his proposal to Microsoft, Shaw emphasized that his course will integrate technical and business perspectives. “Because of the increasing reliance of major organizations on enterprise IT, this course will focus especially on addressing managerial issues and will draw a parallel between trustworthy computing and the ‘total quality management’ movement,” he said. The course is expected to be offered for the first time in the spring 2006 semester.

Shaw, the Leonard C. and Mary Lou Hoeft Endowed Chair in Information Systems and a professor of business administration, says the course will fill a gap in the current PhD and MBA curricula.

Final “assets” from the course will be made available in the public domain, both through Microsoft’s curriculum repository and through national information assurance organizations such as the National Information Assurance Training and Education Center.

Technology & Management Program Endowed

The Technology & Management Program, a joint initiative of the Colleges of Business and Engineering, was renamed earlier this year in honor of a $6-million gift from Leonard and Mary Lou Hoeft.

“With its exceptional students and faculty, industry involvement through the Corporate Affiliates Program, strong leadership, and now a naming endowment, I feel confident that the program will reach new levels of excellence,” said Dean Avijit Ghosh in his announcement of the gift to College staff.

The Hoeft Technology & Management Program will celebrate its ten-year anniversary this year. The Hoefts previously made a gift of $1 million that helped launch the program in 1995. In addition to the naming gift, the Minneapolis couple has established endowed chairs and professorships in the College of Business and the College of Engineering.

Office of Technology Research Initiatives Established

Steven T. Sonka was named director of the newly established Office of Technology Research Initiatives in January. The office will develop research, teaching, and outreach activities in the area of technology management. As director, Sonka will develop and teach courses on technology management, especially for the MS in Technology Management program, and will expand the College’s links with industry as well as other campus units working on technology transfer.

An emeritus professor in the Department of Agricultural and Consumer Economics, Sonka will hold an appointment in the Department of Business Administration. He received his PhD in economics from Iowa State University.

Brown Nominated to National Board

Jeffrey Brown was nominated by the White House in January to fill a vacancy on the Social Security Advisory Board (SSAB). The position requires Senate confirmation.

The SSAB is an independent, bipartisan board created by Congress and appointed by the President and the Congress to advise the President, the Congress, and the Commissioner of Social Security on matters related to the Social Security and Supplemental Security Income programs. The seven-member board, established by legislation passed in 1994, offers testimony to Congress and prepares a variety of reports about Social Security, its financing, and eligibility requirements.

An authority on pensions, Social Security, and annuitization, Brown is currently a member of a National Academy of Social Insurance expert panel formed to study federal retirement policy, which released its report earlier this year.

An assistant professor in the Department of Finance, Brown has been on the faculty since 2002. Also a faculty research fellow with the National Bureau of Economic Research, Brown holds a PhD from MIT, an MPP from Harvard, and a BA from Miami University.

Monroe Honored by Marketing Association

Kent B. Monroe was named the 2005 AMA/Irwin/McGraw-Hill Distinguished Marketing Educator in November. The annual award is the highest honor a marketing educator can receive. Recipients must be universally acknowledged as long-standing leaders in marketing education and must have made extensive contributions to marketing education and the marketing discipline in general.

A dozen faculty members in the Department of Business Administration nominated Monroe for the honor in a letter co-signed by Dean Avijit Ghosh. They cited Monroe’s innovative contributions across multiple spheres that have had a profound and enduring impact on the field of marketing. “His creativity,” they said, “represents a lasting legacy that continues to benefit scholars, teachers, and students.”

Kent M. Monroe is the John M. Jones Professor of Marketing in the Department of Business Administration. He has been at the University of Illinois, where he received his DBA, since 1991. He was previously on the faculties of Virginia Polytechnic Institute and State University and the University of Massachusetts. Monroe is retiring following the spring 2005 semester.
In addition, our staff works in close collaboration with other campus offices to link students to resources outside the College. Our holistic approach to student services provides the benefits of individual attention and the opportunities of an undergraduate experience at a world-class university.
The College of Business knows Chicago is an Illini kind of town.
The Illini Center, downtown at 200 South Wacker Drive, is home to the Executive MBA and MS in Taxation programs.
For more information on these and other programs, visit www.business.uiuc.edu.