Innovating to Create IT-Based New Business Opportunities at UPS

Innovating to Create IT-Based New Business Opportunities at United Parcel Service

Executive Summary

Although the role of information technology (IT) in enabling competitive advantage is well established, many organizations still find it a challenge to convert IT investments and assets into new business opportunities. The case study in this article describes how United Parcel Service (UPS) has used IT investments to create IT assets and IT competencies, which have led to business capabilities, then to new business opportunities. These opportunities were identified by examining the value network that links UPS's internal value chain with its customers to uncover information and IT needs of various business partners.

In particular, we describe five new IT-based business opportunities that benefit UPS and its customers: (1) outsourcing rural deliveries to a competitor, (2) getting customers to do UPS's work, (3) helping customers respond swiftly to product recalls, (4) fixing customers' mistakes and (5) doing customers' work for them.

There are five key lessons from UPS's experience: (1) Integrate internal IT systems before integrating customers' processes, (2) Identify service gaps in customers' business where your IT can add value, (3) Encourage and be open to ideas from front-line managers, (4) Focus first on cost-cutting business opportunities, then on revenue increasing ones, and (5) View information and IT as two distinct assets.

Creating New Business Opportunities with IT

Practitioners have long regarded IT as a tool for creating business efficiencies, serving customers and generating business opportunities. Some businesses have successfully exploited IT to create new business opportunities. One example is Eli Lilly (see Figure 1). Such IT-created new business opportunities often go beyond the well-defined return-on-investment benefits and extract extraordinary returns from IT investments.

However, identifying how and what IT investments create new business opportunities remains a challenge for many organizations. And although practitioners recognize the importance of IT’s strategic role in creating business opportunities, they are concerned about the risk that IT failures can bring. But IT investment cannot be thrust into an organization and expected to yield a payoff. Complementary changes must be made before a business can gain a competitive advantage that will enable it to thrive in the marketplace. The two key questions, then, are:

1. How do organizations identify areas of new business opportunities?
2. What is the process they use to create those new business opportunities?

1 Allen Lee is the accepting Senior Editor for this article.
2 An earlier version of the ideas discussed in this paper was presented at the MIS Research Center Seminar Series of the Carlson School of Management, University of Minnesota. This paper has benefited from comments by Anandhi Bharadwaj, Varun Grover, Alan Jolly, Jonathan Palmer, Sue Sherer, and Barb Slagel. I am thankful for the help from Ted Ley, Hamir Bhatia, and Steve Kendra of United Parcel Service in arranging the site visit and providing comments on this paper. I also acknowledge the extraordinary support of MISQE senior editor Allen Lee in developing this article.
3 A description of Eli Lilly’s IT use and the creation of innocentive.com can be found at http://www.cioinsight.com/article2/0,1540,945629,00.asp.
The UPS case provides answers to these questions.

**UNITED PARCEL SERVICE (UPS)**

UPS was founded in 1907 as a messenger company and now operates in more than 200 countries with revenue of over US$36 billion. IT has played a vital role in creating new business opportunities at UPS. In fact, UPS’s CIO now positions the company as “a technology company with trucks,” rather than a trucking company. UPS has a strong track-record of deploying IT to reinvent the third-party logistics business.

With its significant investments in IT, UPS has built an extensive transportation and logistics infrastructure. In addition to delivering packages, UPS provides specialized transportation, logistics and financial services. The company’s business strategy is to “synchronize commerce”—the flow of goods, information, and funds—and to be a trusted broker between buyers and sellers. Its strategy explicitly includes the use of technology to create new services and to strengthen its operations in its value network.

With commerce becoming global, international operations have become an integral part of UPS’s growth strategy. As such, UPS wants customers to perceive it as a partner in providing logistical support throughout their supply chains, which may involve many participants.

**HOW: Identifying New Business Opportunities in the Value Network**

UPS’s senior executives recognized that IT is becoming increasingly pervasive in enabling global commerce and should therefore play a central role in enabling the company’s business strategy. That strategy required IT assets to gather data and facilitate the smooth flow of packages and information through UPS’s internal value chain (see Figure 2) and among its customers.

---

5. To collect the information for this case, we examined UPS documentation, interviewed IT analysts, and marketing and technology executives, and conducted a site visit.

6. Based on an interview conducted by IBM with UPS CIO and Senior Vice President Dave Barnes. An online transcript is available at http://www-935.ibm.com/services/us/cio/flexible/ups_ebf_videotranscript.pdf.

7. CIO magazine rated UPS among the top 100 companies for its achievement in creating new business value through IT-enabled innovation. See http://www.cio.com/cio-100/2006/winners/index.
The internal value chain supports UPS’s customers—a mix of suppliers, producers, distributors, and end customers. The linkages between the value chain and customers form UPS’s value network8 (see Figure 3, which depicts the flow of both goods and information). UPS examines the movement of goods and information through the value network to determine how it can improve the service it provides to customers. The success of a third-party logistics business like UPS depends on long-lasting relationships with customers. If its customers are not thriving, UPS has nothing to deliver. UPS therefore ensures it is aware of its customers’ “pain points” and constantly evaluates where and how it can add value within the network to alleviate the pain points by capitalizing on its internal value chain efficiencies. Figure 3 also shows the five new business opportunities (NBOs) that UPS identified by examining its value network.

To understand how UPS leveraged its IT investments to create these business opportunities, we first need to introduce a framework for converting existing IT investments into new business opportunities. Our description of the five UPS opportunities (see below) shows how they relate to this framework.

---

**Figure 3: How: Five New Business Opportunities (NBOs) Identified in UPS’s Value Network**

![Figure 3: How: Five New Business Opportunities (NBOs) Identified in UPS’s Value Network](image)

---

**WHAT: A Framework for Creating New Business Opportunities**

In the framework, shown in Figure 4, the beginning point is an existing IT investment (Box 1), which is converted into the end point, a new business opportunity (Box 5).

Practitioners and researchers have suggested that IT by itself creates little specific value. Thus, the process requires the following intermediary components: to create business value, IT investments (Box 1) must first create appropriate IT assets10 (Box 2). In addition, a business needs IT competencies to use the IT assets (Box 3), and these competencies create business capabilities (Box 4). These capabilities are the glue that connects the IT assets and IT competencies at a business level.

The framework also includes complementary assets (Box 6) and an organizational infrastructure (Box 7), both of which support the creation of business capabilities. These two components will be discussed separately, after the description of UPS’s five new business opportunities.

---


FIVE NEW UPS BUSINESS OPPORTUNITIES

Each of the following five new business opportunities enabled UPS to lower costs, increase revenue and profitability, or protect market share.

New Business Opportunity 1: Outsource Rural Deliveries to a Competitor

UPS identified this business opportunity by examining the costs of outbound logistics in its internal value chain. Sustained IT investments in the preceding decade had provided the company with highly integrated information systems. These systems allowed UPS managers to calculate costs for each business activity. The analysis showed that it would be cheaper to outsource the delivery of packages to addresses on some less-traveled rural routes to its competitor, the United States Postal Service (USPS).

The company used its IT assets to implement this decision. By linking bar code data on UPS packages—called Package Level Detail (PLD)—with sorting, consolidation, and delivery of selected packages to the USPS, UPS transaction processing systems continued to provide a seamless tracking capability to its customers. Despite coordination costs, UPS’s IT assets can provide seamless package tracking and lower overall costs. The results of outsourcing some deliveries to its competitor were lower delivery costs and a wider destination choice for UPS’s customers but still with full UPS tracking capability.

In terms of the framework shown in Figure 4, the IT investment in automated operational systems (Box 1) created the IT asset—the PLD, a building block for package tracking (Box 2). The PLD system gathered and stored data in operational databases and a data warehouse (two more IT assets). These IT assets, combined with the IT competency (Box 3) of mining the data in the warehouse, led to the creation of accurate cost calculations for the accounting function. These calculations gave UPS the business capability of understanding its cost structure (Box 4). Costs of each resource (labor, equipment, systems) for every shipping segment were further mined to build activity-level cost allocation models.

UPS cost accountants used activity-based costing (ABC) to identify the profitability for segments of thousands of delivery routes. Unprofitable routes were outsourced to the USPS, which also benefited from the arrangement. Since the USPS already delivered mail on every route, it generated additional revenue for marginal extra costs. UPS continues to exploit ABC data in planning and forecasting resources to ensure that its operations remain efficient.

---

11 USPS offers a service, called Parcel Select, on those rural routes. This service raises additional revenue because the USPS already delivers mail on these routes.

New Business Opportunity 2: Get Customers to Do UPS’s Work

This business opportunity was uncovered when UPS examined the non-value-added time and cost of shipments between its various customers. For example, a supplier might send raw materials to UPS to hold in a warehouse. UPS would then deliver the raw material to a producer, which, after manufacturing a product, might use UPS to ship it to a distributor. The distributor might then use UPS to deliver a product to an end user. Every time UPS picked up a package in this chain of activity, it entered information about the package into its systems, consuming both time and cost.

When UPS managers re-examined the relationships between the company’s different types of customers in the value network, they saw that UPS could deliver packages to producers faster if the supplier input the shipment data directly into UPS’s systems. By extending the reach of UPS inbound logistics to the supplier, UPS saved time by not bringing the packages into the UPS warehouse. Instead, it processed the customer-entered information and scheduled direct delivery to the producer. By getting its customers to do some of the work previously done in-house, UPS reduced ground shipping time by one day. Speed of delivery is a key performance indicator and differentiator in the package delivery business, so a reduction of one day is a significant advantage.13

This business opportunity was enabled by UPS’s integrated IT systems. The company was able to wring out inefficiencies by having shipping customers enter package information directly into UPS’s order entry systems in advance of pick-ups. UPS saved labor costs previously needed to input data and freed up time to plan and schedule labor, storage, and transportation resources. Customers also benefited, even though they now had to enter data themselves, because the latest shipping time was moved from 5 p.m. to 8 p.m. The net result of this business opportunity was lower costs for UPS, faster deliveries, better information for sending and receiving customers on what was arriving and when it was arriving, and a higher proportion of zip codes able to receive early morning deliveries from UPS.

In terms of the framework shown in Figure 4, IT investment in Web-based technology (Box 1) created a geographical information systems (GIS)—the IT asset (Box 2). The GIS provides UPS with the IT competency of optimizing workflow (Box 3). As customers enter PLD data into UPS’s order entry system, the GIS assigns resources to pick up, sort, and deliver the packages. Using the GIS in this way provides UPS with the business capability of having the operational flexibility (Box 4) to generate a manifest that gives the most efficient route, with delivery times and locations. UPS drivers are equipped with another IT asset—a handheld computer known as the Delivery Information Acquisition Device (DIAD)—which generates an electronic manifest before the start of a driver’s work day.

These IT assets, combined with optimized workflow simulation, provide UPS with the business capability of having the flexibility to cut delivery times by one day (Box 4). Getting customers to do UPS’s work frees up time to look for other business opportunities. For example, using the GIS to map delivery routes that minimize left turns enabled UPS to cut 28 million miles from truck routes in 2006—saving roughly three million gallons of fuel.

New Business Opportunity 3: Help Customers Respond Swiftly to Product Recalls

This business opportunity resulted from producers and distributors frequently requesting information from UPS about in-transit packages. UPS customer service representatives recognized that these customers sometimes needed to recall products, or redirect goods already in transit, or renegotiate delivery dates and times with end customers. Dynamic market conditions required them to have greater flexibility and control over goods in transit.

For example, a mail-order pharmacy might realize that it had sent an incorrect prescription to a patient. Or a manufacturer might need to respond to a shift in demand by redirecting goods after they had been shipped. To respond to such needs, UPS’s systems had to be flexible enough to quickly respond to requests from its customers to track a package or a shipping palette.

UPS operations managers were able to leverage the company’s integrated internal systems that provided information about a package’s location (container, truck, ship, or aircraft) to develop the capability to locate and intercept any package within 15 minutes.14

13 Reducing shipping time by a day has been referred to as the most significant development in ground deliveries since the inception of UPS. See Brooks, R. “Leading the News: UPS Cuts Ground-Delivery Time; One-Day Reduction Aims To Repel FedEx Assault On Company’s Dominance,” Wall Street Journal, October 6, 2003, p. A3.

14 In March 2007, UPS began offering its customers a Web-based capability to intercept and reroute packages. See http://www.pressroom.
Thus, when a lawn mower manufacturer shipped a batch and then found that a part was defective, UPS was able to intercept the shipment, reroute it to the nearest dealership for part replacement, and still deliver the lawn mowers to their destination on time.

This business capability increased revenue for UPS with relatively low incremental costs. Its marketing managers are now considering generating additional revenue from the “intercept and reroute” capability by offering to insure customers against such mid-stream changes.

Relating the implementation of this business opportunity to the framework in Figure 4, UPS adopted eXtensible Markup Language (XML), a web programming language that also adds definitions to data fields, to develop systems for its IT investment in Web-based technologies (Box 1). This enabled UPS to create the IT asset of an XML-compliant extranet (Box 2), which allowed it to pass customers’ tracking information to another IT asset—the automated systems that control the conveyers and chutes in its trans-shipment warehouses. With these IT assets, and the IT competency of connecting its customers to its internal value chain (Box 3), UPS created the business capability of intercepting and rerouting packages on short notice (Box 4)—that is, of greater flexibility in the customer service it provides. As a result, UPS can now help customers take swift action during product recalls, because it can stop or redirect a delivery on short notice (Box 5). This new business opportunity was made possible because UPS’s internal value chain enabled its customers to be flexible in responding to the changing needs of their businesses. In particular, it provided them with additional flexibility in choosing a date and time for the delivery of packages.

New Business Opportunity 4: Fix Customers’ Mistakes

The idea for fixing customers’ mistakes (and charging them for doing so) emerged when UPS’s systems tracked a backlog of packages within its internal value chain. Operations managers mined data and discovered the backlog resulted from incorrect or incomplete delivery information entered by customers. UPS incurred costs in contacting customers to rectify the address while holding the packages. Further, it found that many such packages were eventually returned to the sender, resulting in a loss of revenue for UPS and reshipping costs and delivery delays for customers. UPS realized that customers were more than willing to pay an additional fee if it could fix their mistakes for them.

UPS modified its systems so that when the scanning system in a sorting center detects an incorrect address on a package, the PLD image is displayed on an analyst’s computer screen, together with possible correct addresses. The analyst selects the most likely address and makes a correction on the electronic image of the package. The changed address is then available to all downstream applications, such as those for routing containers and allocating space on delivery trucks.

In terms of the framework in Figure 4, the PLD bar code label, and the IT investments in systems to capture and use this data (Box 1), is the key to accurate and timely delivery of every UPS package. Customers enter package dimensions and the destination address information directly into UPS’s Web-based system, thus increasing the accuracy of PLD data. However, customers occasionally make mistakes when inputting the package information. To implement systems that can fix these mistakes, UPS made use of two primary IT assets (Box 2). The first is high-resolution digital cameras that capture package dimensions and addresses on PLDs. The second is the Criss+Cross online directory, which UPS purchased. This directory contains every valid U.S. street address. Combining these IT assets with the IT competency of amending the address on an electronic image of a package (Box 3) gave UPS the business capability of providing its customers with a better, more flexible service (Box 4). Having the capability of delivering incorrectly addressed packages helped UPS create this new business opportunity.

New Business Opportunity 5: Do Customers’ Work for Them

UPS uncovered the business opportunity of doing customers’ work for them (and getting paid for doing it) by examining the information flow in the value network between its manufacturing and distribution customers. The company’s marketing service representatives found that overseas manufacturing customers were delivering goods to a warehouse where they were repackaged before UPS reshipped them to end customers.

An example was Nikon, which shipped cameras to distributors’ warehouses, where the camera shipments were deconsolidated, then repackaged into “kits” with batteries and chargers, and finally shipped to retailers. UPS examined Nikon’s repackaging costs.

ups.com/pressreleases/archives/archive/0,1363,4877,00.html.
Innovating to Create IT-Based New Business Opportunities at UPS

and determined that it could offer this service at lower costs and improve Nikon’s time-to-market. Now, UPS coordinates multi-modal (land, air, and sea) shipments from Nikon’s manufacturing centers in Korea, Japan, and Indonesia, and uses its own warehouses to repack the cameras and ship the final packages to retailers across the U.S., Latin American, and the Caribbean.

Thus by examining the value network, UPS discovered it could act as a repackaging intermediary. It could provide this type of service because it already had its own trans-shipment warehouses and a well-integrated internal value chain.

UPS’s investment in enterprise resource planning (ERP) systems (Box 1 in the Figure 4 framework) and its IT asset of an integrated supply chain (Box 2) gave it the IT competencies of coordinating multi-modal shipments and providing customers with deep supply chain visibility (Box 3). Its Trade DirectSM solution (another IT asset) provides it with the operational flexibility of allowing producers to bypass distribution centers and deliver directly to end customers15 (Box 4).

Dell provides an example of how this business opportunity works in practice. Dell inputs the type and quantity of computer systems, and delivery and customer information into Trade DirectSM. UPS already has information—such as the delivery schedule, supplier, and location—for various components like monitors, keyboards, and processors, so it is in a position to do much of Dell’s work (Box 5). It procures the components, repackages, them and custom labels the packages while in transit, and delivers them directly to the end customers. By doing work for its customers, UPS saves them the time and costs involved in trans-shipments, storage, and customs clearance.

**COMPLEMENTARY ASSETS AND INFRASTRUCTURE**

Figure 5 summarizes how UPS’s IT investments, assets, and competencies, and its business capabilities have coalesced to create the five new business opportunities described above. In the process, UPS created complementary non-IT assets and an organizational infrastructure of processes, as described below.
To convert business capabilities into new business opportunities, UPS senior managers in charge of developing strategy had to create complementary assets and an appropriate organizational infrastructure of processes.

**Complementary Assets**

Complementary assets (Box 6 in Figure 4) ensure that UPS has the capacity to exploit new business opportunities when they become available. Such assets include physical assets like trucks and warehouses, as well as expertise resulting from training or from new hires. One complementary asset is the availability of trained labor to support sorting operations, which generally occur overnight at a trans-shipment port. Because sorting personnel work part time, UPS holds evening classes on its premises and, with the cooperation of state education authorities, underwrites the education of employees. This scheme secured the availability of labor resources for the late-night sorting operations.

Another complementary asset is aviation expertise. UPS purchased airplanes, hired pilots, and built expertise to run airport operations, making it one of the 10 largest airlines in the world. It has also acquired warehousing companies and developed expertise to manage brokerage and warehouse operations. Further, UPS’s continuous focus on cost control and efficiency has motivated managers to acquire in-house expertise in activity-based costing and other accounting methodologies, in knowledge of allied business functions, such as customs and excise laws, and in warehouse automation, such as IT-integrated conveyer belts and transportation chutes.

**Organizational Infrastructure of Processes**

To execute its business strategy to “synchronize commerce,” UPS developed an organizational infrastructure of processes (Box 7 in Figure 4) that allows it to be closely engaged with its customers, so it can sense their needs and quickly respond to them. This infrastructure, together with access to rich information about the movement of goods, has enabled marketing managers to develop a process for identifying, prioritizing, developing, and deploying new business opportunities. This process is part of the organizational infrastructure and is described below.

Most ideas for new business opportunities come from UPS field personnel such as customer liaison staff. Business capabilities that are requested by customers or that benefit customers take precedence over other capabilities. Marketing managers maintain a close working relationship with customers and have a deep understanding of their operations. They are continually on the lookout for unmet customer needs or potential new value-added services that UPS can provide to make it easier for customers to run their businesses.

Usually, UPS’s customers (suppliers, producers, distributors, and end customers) communicate and coordinate activities among themselves. However, UPS is often asked to provide supporting product and delivery information. By matching customer information identified within the value network with what UPS can provide, marketing managers can approach a customer with a value proposition. If there is sufficient interest from the customer, a cross-functional team consisting of industrial engineers, external consultants, and accountants assess the overall cost-effectiveness of the proposal. If the potential value looks promising, UPS’s marketing managers and the customer jointly initiate a request to UPS's Customer Technology Marketing (CTM) group for a prototype, or a proof-of-concept. This group comprises technology analysts and business analysts who work closely with the customer to test the prototype and ensure the business requirements have been well articulated. Through matrix testing, the performance results of each business requirement are measured against the matching IT competencies.

If the prototype is successful, managers in the UPS Professional Services Group deploy the IT-based new business opportunity to a larger number of customers, usually 30 or 40, before offering it as an IT-based product to all UPS customers worldwide.

The steps in this process are described in Figure 6. In many cases, the extent of opportunities was not apparent or anticipated when the original IT investment was made. However, the alertness of UPS front-line managers in recognizing customer needs, together with UPS’s IT competencies, has enabled existing IT investments to be converted into new business opportunities. The steps shown in Figure 6 are illustrated by another recent new business opportunity that UPS is currently deploying.

---

16 Interviews with UPS managers indicate that several operations managers did not envisage the potential of IT investments until after the systems were implemented.
Innovating to Create IT-Based New Business Opportunities at UPS

NEW BUSINESS OPPORTUNITIES IN WAITING

New business opportunities in waiting are other opportunities that UPS is developing, often based on business capabilities already gained. For example, the five opportunities described above provided UPS with three additional business capabilities—(1) a better understanding of its cost structure, (2) operational flexibility and (3) customer service flexibility. The latter two were enabled by UPS’s IT competency of integrating its internal IT systems with customers’ systems.

Other UPS capabilities have the potential to create future new business opportunities. Integrating customer information with package details, for instance, now enables UPS to notify customers of any critical shipping event, such as a customs delay at a port or inclement weather. The company is also leveraging its integrated information systems to provide paperless foreign billing, to overcome delays in international package delivery. International packages are often held at customs offices because of missing or incomplete paperwork. UPS is well positioned to ensure compliance with international laws and customs procedures for goods destined for end customers across continents because it deals with a variety of customers worldwide.

UPS marketing managers also envision that, by examining the value network shown in Figure 4, they can identify opportunities for adding value by UPS intermediating among its customers and providing them with information about its products, delivery, and even the movement of documents and funds. UPS is also expanding its IT capabilities. Its IT managers are experimenting with radio frequency identification (RFID) technology to further automate the company’s operations.

---

<table>
<thead>
<tr>
<th>Steps</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Identify projects</strong></td>
<td>By examining the flow of information in the value network, UPS identified two competing new business opportunity projects: (i) reducing invoice delays between producers and distributors, and (ii) developing special packaging to ship biological material for microbiology shippers.</td>
</tr>
<tr>
<td><strong>2. Prioritize projects</strong></td>
<td>A paperless invoice system to reduce delays was chosen as higher priority because it affected on-time delivery and impacted international customers—a fast-growing segment of UPS’s business. Priority is given to customer-facing systems such as those that ensure on-time delivery, link external partners, and give customers more visibility into the supply chain.</td>
</tr>
</tbody>
</table>
| **3. Establish a cross-functional team** | A cross-functional team comprised of industrial engineers, accountants, system developers and external consultants examined the cost of reproducing lost or delayed invoices and the impact of delays at internal customs clearance on delivery times. The team examined:  
- Continuing maintenance costs of “cockroach” systems (systems that appear in isolated parts of UPS or its subsidiaries)  
- Which systems can be integrated  
- What new information assets must be created.  
Integrated IT assets needed were shipping platform systems to create automated invoices, servers to host applications, and international harmonized tariff codes. |
| **4. Perform costing for the project** | Given the expense of running the existing system, the team of IT analysts and marketing managers decided to “sunset” older systems in favor of new systems. Marketing managers analyzed the impact of paperless invoicing on cost reduction, increased revenue or profitability, and protecting market share. In addition to the anticipated cost savings, the new systems were expected to increase revenue from new customers alone by US$150 million. |
| **5. Collaborate with a customer to develop and test a prototype.** | The Customer Technology Marketing (CTM) group worked with one large international customer and sought help from the U.S. Department of Commerce to help establish standards for customs clearance rules. |
| **6. Test the new business opportunity** | Through liaison with the brand managers of selected customers, the Professional Services Group (PSG) is currently exploring opportunities to implement a paperless invoicing system and to establish UPS as a broker, as well as a shipper. |
UPS has recently developed another new business capability—a new way to land airplanes called “continuous descent arrival.” Based on its expertise of running an airline, UPS developed a GPS-based aircraft navigation system to guide planes into an airport as an alternative to radar-based air traffic control systems. The GPS system saves UPS several minutes and 50 to 100 gallons of fuel per flight so it is more environmentally friendly than radar systems. GPS technology is also safer. The United States’ Federal Aviation Agency (FAA) is now partnering with UPS to further develop this technology to reduce airport congestion. This and other business capabilities will likely lead to future new business opportunities for UPS and its customers.

**Risks with IT investments**

UPS’s experiences highlight the risks of using IT investments to create new business opportunities. Although IT helps UPS lower operating costs and provide better customer service, providing more information to customers can lower entry barriers for low-cost competitors.

For example, one of UPS’s initiatives enabled other businesses to provide information-based products at the expense of UPS. To improve customer service, UPS offered delivery dates and time guarantees to its customers. To back up the guarantee, it offered to discount service fees depending on the length of delay. Third-party businesses stepped in and offered UPS customers an analysis of delayed shipments (for a fee) by downloading data from UPS’s systems, thus intermediating themselves between UPS and its customers. Ironically, UPS created the first and fifth new business opportunities described earlier (outsourcing to a competitor and doing customers’ work for them) by doing the same: intermediating itself between upstream and downstream customers.

Creating new business opportunities from IT investments can expose organizations to other risks. First, creating business opportunities is inherently a resource-intensive process, and the anticipated competitive advantage may never materialize. Second, pursuit of particular business opportunities can lock an organization into an IT infrastructure choice that may limit the creation of future business opportunities. Third, business opportunities that result in a competitive advantage encourage imitation or enhancement by competitors—for example, UPS responded to FedEx’s online package tracking initiative by providing online tracking with an image of the recipient’s signature. The brutal truth is that the more successful the business opportunity, the shorter its expected “shelf-life.” Finally, convincing a business’s executive team to make IT investments to support uncertain business opportunities often requires expending political capital. Risk-averse managers may shy away from investing in opportunity-generating IT, especially if other less-risky opportunities exist.

**Mitigating Risks in Creating New Business Opportunities**

Thoughtful planning can mitigate risks when identifying dual-purpose IT investments that will both enhance the IT infrastructure to support existing business opportunities and enable new ones. Proposals for IT solutions that also, for example, improve time-to-market or reduce defects will have greater certainty of a payoff and are more likely to be accepted if they are driven by a partnership of IT managers and business leaders. Further, proposals for IT-generated business opportunities will have greater organizational support if the IT investment attempts to address organizational pain points, such as reducing lost contract bids, providing a defense against an aggressive competitor, or reducing litigation. Managers will expend less political capital in getting such projects approved. The overall risk to the organization will be mitigated if such IT investments are channeled to build assets and competencies that can eventually also generate business opportunities.

However, organizations should not rely on new business opportunities being discovered by accident. Organizations will enhance the chances of exploiting IT investments and creating business opportunities if their culture supports and encourages risk taking. In such a culture, managers encourage out-of-the-box thinking and the quest for solutions to nagging problems, and provide a forum to exchange ideas for creating new business opportunities.

**FIVE KEY LESSONS FROM UPS**

This study of UPS provides five key lessons for organizations that want to convert their IT investments into new business opportunities.
Lesson 1: Integrate Internal IT Systems Before Integrating Customers’ Processes

Before an organization can (re)act to exploit market opportunities to create new business opportunities, it must already have invested in the necessary internal integrated IT infrastructure. Once it has recognized a new business opportunity, an organization must then make further investments to integrate internal systems with those of its partners for purposes such as joint product design, simulation, or sharing inventory information. For example, an existing ERP system can be extended to link with business partners’ systems to create the business opportunity of shorter time-to-market. But to capitalize on this opportunity, the organization will need to make further complementary investments in developing partner interface processes and assigning a team of engineers to evaluate such interfaces.

UPS’s integrated IT systems, and the supply chain flexibility they enabled, were extremely valuable after the events of September 11, 2001. Following the attacks on that day, newly enacted regulations required shipping companies to cooperate with U.S. Homeland Security authorities in tracking the movement of global cargo. UPS complied with the regulations and provided Homeland Security authorities with access to its internal value chain, much like it did for its customers. The integrated IT capabilities ensured that Homeland Security inspections had no significant impact on the timeliness or accuracy of UPS deliveries. Without its integrated IT business capability, UPS would have had to designate additional personnel to respond to queries by the authorities and wait until the packages were cleared, quite possibly adding one or two days to international deliveries. Further, UPS’s operational costs would have increased because it would have had to invest in larger warehouse space, resulting in higher labor costs.

Internal integration of IT systems can also lead to innovative applications. Before investing in new IT, companies should determine whether the required information can be accessed by linking existing systems. UPS’s IT business managers told us they were frustrated by the high level of redundancy in the company’s data and information systems, due in part to several acquisitions. A significant percentage of new IT investment now goes to integrating existing systems. There would have been gross inefficiencies if UPS had offered supply chain visibility to its customers before it had integrated its internal IT systems.

Lesson 2: Identify Service Gaps in Your Customers’ Business Where Your IT Can Add Value

Successful companies have deep and pervasive knowledge of their customers’ business models. They know how customers make money and what activities erode their profits. As described earlier, organizations can examine their value networks to identify the participants, their business activities, and their unfulfilled information needs. For example, the value network for an oil refinery includes drilling and shipping companies (supply), and trucking companies, gas stations, and motorists (demand). The value network for a software products company such as Intuit or Symantec includes large corporate licensees, retailers, and end users. However, such companies can sell online to end users, in which case the value network may include only two participants.

An organization that knows its customers’ business models can identify which activities are inconvenient for a customer to execute and where the customer’s pain points are. Armed with this information, the organization can then assess its IT competencies to identify how it can add value to the customer’s activities by doing them cheaper or filling in the gaps. For example, an organization might analyze the information frequently requested by a customer and then work out what decisions and actions the customer takes using that information. Finally, the organization should evaluate whether it can provide that activity as a product or service. UPS’s experience suggests that such ideas often emerge from customers making a complaint or a suggestion.

Lesson 3: Encourage and Be Open To Ideas From Front-line Managers

IT-generated new business opportunities are more likely to emerge within organizations that listen to their front-line managers who liaise directly with customers. Front-line managers are the first to hear about competitive threats and are well placed to discover new opportunities. To avoid losing this type of information, an organization should record it in a customer relationship management (CRM) system and have it evaluated by a cross-functional team. Exploiting such information also requires the organization to recognize and reward visionaries and

18 See also Kohli, R., and Melville, N. “Extracting Untapped Business Value: Learning to Build an IT Innovation Platform,” Communications of the ACM (forthcoming). This paper describes three cases studies, including UPS, and identifies similarities in organizations that excel at creating new opportunities from IT.
those who execute the vision. An environment that encourages integration of information and cross-functional pollination of ideas on how to better serve customers will be a fertile breeding ground for the creation of new business opportunities.

**Lesson 4: Focus First on Cost-Cutting Business Opportunities, Then on Revenue-Increasing Ones**

Although IT systems can improve profitability, an organization’s IT maturity will help to determine whether new business opportunities will increase profitability through lower costs or higher revenue. Conventional wisdom suggests that companies have more control over their costs than revenue. Yet three out of the five new business opportunities at UPS led to higher revenue. The reason, according to a supply chain manager in UPS’s Worldwide Services division, is that the company has “just about exhausted efficiency gains from IT.”

The implication is that companies with a longer history of successfully exploiting IT may reach a point where additional efficiency gains are hard to achieve. We postulate that, because most companies are not yet as sophisticated as UPS in their use of IT, they will likely gain the highest returns at present from IT-based business opportunities directed toward cutting costs rather than toward increasing revenue. After internal efficiencies and optimized processes have helped to contain costs, companies can then pursue new opportunities to increase revenues.

**Lesson 5: View Information and IT as Two Distinct Assets**

Although IT and information are sometimes regarded as indistinguishable, they are distinct assets and often yield different forms of value. IT can yield significant value from, for example, integrating inventory and billing systems via a Web-based extranet that enables access to customer inventory, accepts online orders, and makes electronic payments. Self-service applications, such as UPS’s Trade Direct, reduce operational costs and improve customer service. Similarly, IBM has integrated various IT systems to create its automated storefront at ibm.com, which now captures online orders in excess of US$1 billion per year.

Information, on the other hand, is produced by mining vast amounts of data gathered over a period of time. Innovative new business opportunities are created when analysts and managers view information as an asset and make informed decisions based on their analysis. Two of the five UPS new business opportunities—outsourcing to the U.S. Postal Service and helping customers respond swiftly to product recalls—originated from information mined from the company’s data warehouse.

Companies should start by mining data to analyze the cost structure of their products and services. High-cost steps can be automated or outsourced, with IT providing seamless integration. Patterns of cost, quality, and customer service that emerge from analyzing the information are highly valuable in “informating” workers, supervisors, and managers. Informated employees will more likely act in ways that ensure quality service and improve profitability.

These five lessons from the UPS case can be used by managers in other organizations as they pursue new IT-driven business opportunities.

**ABOUT THE AUTHOR**

Rajiv Kohli (rajiv.kohli@mason.wm.edu) is an associate professor of Management Information Systems at the College of William & Mary. He received his Ph.D. from the University of Maryland, Baltimore County. For over 15 years, he has worked or consulted with IBM Global Services, SAS Corporation, United Parcel Service, AM General, Westinghouse Electronics, Wipro Corporation, and Godrej Industries, in addition to several healthcare organizations. Prior to joining full-time academia in 2001, he was a project leader responsible for decision support services at Trinity Health. His research has been published in *MIS Quarterly, Management Science, Information Systems Research, Journal of Management Information Systems,* and *Communications of the ACM,* among other journals. He is a co-author of *IT Payoff: Measuring Business Value of Information Technology Investment* published by Financial Times Prentice-Hall. He has also received several grants for information systems research.

---

19 In an interview with ZDNet, UPS CIO Dave Barnes was quoted as saying that UPS will save $600 million per year through package flow technologies that include preloading vehicles in the morning, routing drivers according to volume, and favoring right-hand turns. See http://zdnet.com.com/1606-2_2-5967129.html.