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Beyond the Business Case:

New Approaches to IT Investment

As IT becomes more closely tied to business objectives, successful investment must consider two dimensions: technology scope and strategic objectives.

**Jeanne W. Ross and
Cynthia M. Beath**

When senior managers at United Parcel Service (UPS) first decided more than 15 years ago that package tracking had become a competitive necessity in the package-delivery industry, they discovered that developing the capability was not as simple as writing or buying a package-tracking application. The company needed to develop networks, databases and processing capacity before it could even begin to offer tracking services.¹ In late 1997, Delta Air Lines began focusing essentially all its information-technology spending on rebuilding its airport systems and infrastructure, in part to address Y2K concerns. But shortly after Jan. 1, 2000, in what the CIO described as a “land rush,” line managers submitted requests for IT investments that totaled almost three times what Delta could allocate. Each request presented a business case that promised significant positive returns on investment. But combined, they far exceeded the ability of the IT unit to deliver.²

Such experiences are not unusual. In the last 15 years, a tidal wave of IT-enabled initiatives, from business-process reengineering to enterprise-resource planning, has elevated the importance of investing strategically in IT.

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The Internet alone has created numerous opportunities to reengineer processes, introduce online products and services, approach new customer segments and redo business models.³ But although the opportunities seem limitless, the resources required (capital, IT expertise, management focus and capacity for change) are not.

Traditional approaches to IT investment attempt to identify projects with the best profit potential. Proponents of the invest-

ment must “make the business case” to senior management. The heightened strategic importance of IT, however, has forced companies to think differently. They now must weigh the returns on individual investments against demands for organizationwide capabilities. They also must assess opportunities to leverage and improve existing systems and infrastructures in light of opportunities to create new capabilities and test new business models. The complex trade-offs are leading to new IT-investment patterns.

IT Funding Practices at 30 Companies

The objective of our study was to describe the processes by which companies were incorporating e-business into their business models. We collected data between October 1999 and March 2000 in hourlong telephone interviews. At 18 companies, we interviewed both a business executive and an IT executive who had responsibility for e-business. At 12 companies, we talked with either the head of e-commerce or the IT executive responsible for e-commerce. In total we conducted 48 interviews.

A major question was how companies justified investments in their e-business systems and infrastructures. Of 30 companies, 25 said they traditionally relied on making a business case to justify IT-investment funding. All but three, however, funded at least one e-business initiative without a business case. Senior managers simply allocated funding for initiatives perceived as strategic.

At 16 companies, executives made a lump-sum allocation for companywide infrastructure. Typically, they were responding to the perception that the company could not meet changing customer demands or pursue new business opportunities with the existing infrastructure. One bank, for example, invested heavily in

networking capabilities in anticipation of rapid growth in electronic banking services.

At 12 companies, senior managers created a separate budget for e-business experiments. As an example, Manheim Auctions, which sells to used-car dealers, established a separate unit to develop the capability to sell cars and related services online.* Doing so allowed faster, more focused development of new business models.

The limitations of using business cases for e-business initiatives were highlighted by one enterprise’s initial foray into e-business. A marketing project was justified on the basis of the return on investment expected from the \$1 million it required. But successful implementation depended upon an additional investment of \$5 million for networking and Web-services technologies, as the IT unit was quick to point out. The business had no mechanism for justifying companywide infrastructure investments, so the project sponsor agreed to absorb the extra cost, arguing that others would benefit. Eventually recognizing the importance of shared infrastructure, the leadership instituted exceptions to business-case analysis.

THE COMPANIES WE INTERVIEWED:

Air Canada
Amtrak
Arcadia Group
BCEE
Brady Corporation
British Airways
C.H. Briggs
Cisco Systems
CompUSA
Confindustria
DHL International
Delta Air Lines
E-Chemicals
E.I. du Pont de Nemours and Co.
Elf Atochem North America
FleetBoston Financial Corp.
HADCO Corp.
IBM Global Services
Johnson & Johnson
Karstadt
Manheim Auctions
Ostergaard
Pitney Bowes
S.S. Lazio
Safeway
Sprint
State of Maryland, Dept. of Labor,
Licensing and Regulation
Transitions Optical
United Parcel Service
Yellow Freight System

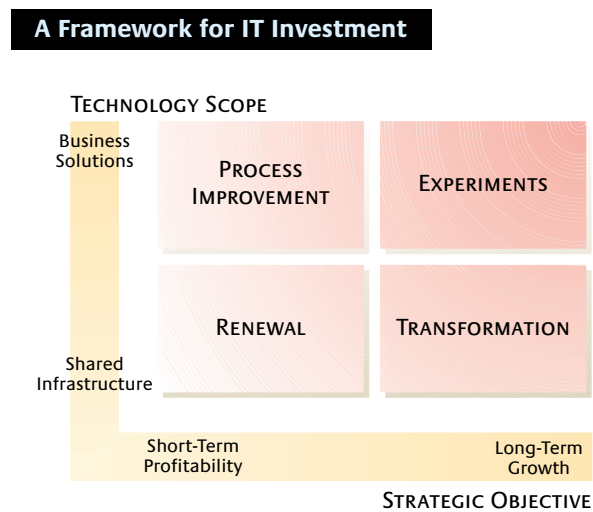
* See R. Woodham and P. Weill, “Manheim Interactive: Selling Cars Online,” working paper 314, MIT Sloan School of Management Center for Information Systems Research, Cambridge, Massachusetts, August 2001.

To learn how IT-investment practices are changing, we interviewed business and IT executives at 30 U.S. and European companies about their e-business initiatives and the IT investments that supported those initiatives.⁴ We found that many executives were abandoning the security of the business case. (See “IT Funding Practices at 30 Companies.”) However, they were unclear as to whether they were establishing a precedent that would shape future behavior or merely taking a temporary detour. Our perspective is that lasting pressures have permanently changed how companies approach the problem of justifying IT investments. Given that technological and market changes are intensifying dependence on IT, it seems more prudent to adopt new investment strategies not as exceptions, but as part of a deliberate rationale that says success comes from using multiple approaches to justifying IT investments. Making the business case is only one approach.

The IT-Investment Framework

For many years management teams have struggled to achieve both short-term profitability and long-term survival and growth through their IT investments. Usually, they have expected profitability from new business applications and have regarded IT infrastructure as something necessary for long-term survival and growth. Electronic business opportunities have changed perceptions. Infrastructure services such as integrated systems, data accessibility and secure networks are now critical to short-term profitability.⁵ And long-term growth and survival depend on developing business applications that test emerging business opportunities.

Analyzing the practices of companies in our study, we found that investments differ along two dimensions: *strategic objectives*,



essary IT capability. Transformation investments are necessary when an organization’s core infrastructure limits its ability to develop applications critical to long-term success. (See “Characterizing IT Investments.”) Transformation is triggered by the growing need for integrated customer data, end-to-end processing and platforms that provide around-the-clock support. Transformation initiatives are often risky, undertaken when companies have determined that *not* rebuilding infrastructure significantly is even riskier.

Enterprises whose outdated IT infrastructures have pushed them into a competitive crisis invest heavily in transformations. In its three-year \$1 billion infrastructure overhaul, Delta ripped out dozens of functionally oriented applications — each with its own distinct platform — and installed a shared-data environment supporting a new suite of applications and services.

Success comes from using multiple approaches to justifying IT investments. Making the business case is only one approach.

which highlight the trade-offs between short-term profitability and long-term growth, and *technology scope*, which distinguishes between shared infrastructure and business solutions. (See “A Framework for IT Investment.”) To address both dimensions companies need to make four distinct types of investment: transformation, renewal, process improvement and experiments.⁶

Transformation As companies attempt to migrate to a more electronic business environment, many find that they lack the nec-

The key feature is a *publish-and-subscribe* capability that makes data on flights, customers, crews, equipment and baggage simultaneously available to appropriate Delta systems and employees. Formerly, silo systems had kept Delta from responding accurately to customer questions. But with the new infrastructure, the company was able to develop systems to serve customers accurately and efficiently, facilitate equipment and crew reassignments during irregular operations and support new airline-security measures.

Characterizing IT Investments

Investment Type	Drivers	Funding Approach	Probable Owner	Sample Initiatives
Transformation	A core infrastructure that is inadequate for desired business model	Executive-level allocation	Entire company or all affected business units	ERP implementations Transforming network to TCP/IP Standardizing desktop technologies Building data warehouses Implementing middleware layer to manage Web environment
Renewal	Opportunity to reduce cost or raise quality of IT services A vendor's decision to stop supporting existing technology	Business case Annual allocation under CIO	Technology owner or service provider (usually IT for shared components)	Purchasing additional capacity Enabling purchase discounts Facilitating access to existing data Upgrading technology standards Retiring outdated systems and technologies
Process improvement	Opportunity to improve operational performance	Business case	Strategic business unit (SBU), process owner or functional area that will realize the benefits	Shifting customer services to lower-cost channel Allowing employees to self-serve for benefits, HR services Shifting data capture to customers Eliminating costs of printing and mailing paper reports or bills Streamlining cycle times for processes Capturing new data automatically
Experiments	New technologies, new ideas for products or processes, new business models	Business or executive-level allocation	IT unit, SBU or functional area needing to learn	Testing demand for new products Testing cannibalization of channels Learning if customers can self-serve Testing new pricing strategy Assessing customer interest in new channels, new technologies Assessing costs of new channels

Renewal The shared or standard technologies introduced when infrastructures are transformed eventually become outdated. To maintain the infrastructure's functionality and keep it cost-effective, companies engage in renewal. The potential benefits of renewal initiatives include improving maintainability, reducing support and training requirements, and making existing capacity more efficient. Renewal initiatives also may be driven by a vendor's decision to withdraw support from older products.

One financial-services firm, after deploying various e-business applications on its standard Windows platform, recognized that the Windows environment could not handle its transaction volume. So the company moved the applications to Unix platforms. Years earlier, in adopting Windows as a single-standard desktop environment, the firm had undergone a transformation. The migration to Unix, in contrast, enabled the same business outcomes, but reduced downtime and maintenance costs.

Process Improvement Business applications leverage a company's infrastructure by delivering short-term profitability through process improvements. Business-process improvements should be low-risk investments because, unlike transformation initiatives, they focus on operational outcomes of existing processes. When Delta invested in a new application to support its boarding process, management knew with relative certainty how much it would cost to develop and support the software, what improvements in the boarding process would result and what the business value of those improvements was to the company.

To reach that level of predictability, process improvements must build on existing IT infrastructure. At Delta, the new boarding application leveraged the centralized customer and flight databases, a layer of middleware providing access to that data and the shared, interoperable technology platforms. The new infrastructure had driven fundamental organizational

change; the new boarding application merely streamlined an existing process.

Experiments New technologies present companies with opportunities or imperatives to adopt new business models. To learn about those opportunities or imperatives and about the capabilities and limitations of new technologies, companies need a steady stream of business and technology experiments. Successful experiments can lead to major organizational change with accompanying infrastructure changes or to more-incremental process-improvement initiatives.

include not only additional process improvements, but also reduced IT-operations costs or reduced time to initiate new shared IT services. For example, the claims unit of Travelers Insurance invested heavily to create its initial work-flow system in the early 1990s. Subsequent systems built on the same base were developed with less than one-quarter the time and cost.

Investments in shared infrastructure will shape, for better or worse, the opportunities available. If senior management directs transformation investments with that in mind, the company's overall IT capability is more likely to support its strategic business direction. When companies separate their infrastruc-

Investments in shared infrastructure will shape, for better or worse, the opportunities available.

Brady Corp., a \$500 million global manufacturer of identification solutions, decided in 1995 to start using the Internet to support its direct-to-customer channel.⁷ In order to learn about Internet technology and customer reactions to e-business initiatives, Brady developed a limited online catalog. Customers drifted toward the Web-based catalog only gradually, but the experiment clarified the potential benefits of a full-scale online catalog and buttressed arguments for an organizational transformation that was already under way.

Similarly, Staples, an office-supply superstore, put all its performance reports on the Web in order to learn about the benefits of an intranet. Building on what was learned, Staples developed business cases to justify additional intranet-based services, such as Benefits-at-Work, an online system for servicing employee-benefits needs, and a Web-based help desk to answer employee questions about product features, facilities issues and systems.

Distinguishing Among Investment Types

Although the four types of IT investment are conceptually distinct, they are difficult to distinguish in practice. A successful experiment may prompt a process improvement. Or process-improvement initiatives may leverage a transformation. For example, Staples and Delta embarked on process improvements in the early stages of their transformations. But companies should distinguish transformation investments from process-improvement investments if the benefits will be realized by different parties.

Process improvements may boost operating results of a particular business unit, but the benefits of a new shared infrastructure may be companywide and longer lasting. Benefits may

investments from process-improvement investments, managers quickly learn to identify opportunities to leverage a particular infrastructure rather than insist on solutions that require a different one.

Distinguishing between experiments and the investments that successful experiments trigger presents a different challenge. When successful experiments are scaled up and rolled out, the company may invest in new infrastructure or applications. UPS developed an online returns-and-exchanges offering to test customer reaction. When the company eventually rolled the product out, it used the existing infrastructure to capitalize on high-volume transaction-processing capability and shared customer and package databases. (See "IT Investment at United Parcel Service.")

In hindsight, an experiment and its subsequent process improvement may look like a single investment. But companies can, and should, make a distinction between an investment in an experiment designed to reveal profitability estimates and an investment in a process improvement that is expected to yield additional profits.

Perhaps the toughest distinction is between transformation and renewal. Renewal investments replace old shared technologies with newer, more powerful or more cost-effective ones. Renewal may foster process improvement, but that is not its primary objective. Transformation, on the other hand, intentionally changes an enterprise's infrastructure in ways that not only enable, but usually demand, process change. Because the value of renewal initiatives does not depend on making changes to a business process, these initiatives are often the

IT Investment at United Parcel Service

In the late 1980s, United Parcel Service CEO Oz Nelson decided that information-technology leadership was critical to long-term success in package delivery. Responding to competitor moves, UPS embarked on a transformation, also systematically investing in process improvement, renewal and experiments.

THE TRANSFORMATION

Over 10 years, UPS invested \$11 billion to build a centralized data center, hire technical experts, create a global network, develop three shareable databases, implement enterprisewide applications and build a redundant operations environment to protect against disaster. The management team did not insist on financial justifications. Instead, it funded CIO-led initiatives to build the IT foundation necessary to compete in the industry.

PROCESS IMPROVEMENT

On that foundation, UPS built new applications to improve customer service, broaden service offerings, increase worker productivity and extend geographic reach. When the Internet became a viable channel in the mid-1990s, UPS built Web-based front ends for existing systems and identified new Web-specific

products and services. UPS justified the investments in much the same way it had justified applications in the past: using business cases, or charters, to specify the costs and benefits. However, the charters differ from the usual business case in two ways. First, whereas business cases are typically developed for a single business “silo,” UPS’ charters often support cross-functional processes. UPS has established four teams, each of which represents one of the firm’s key cross-functional processes. Each cross-functional team submits its application priorities to a senior management committee, which makes the final determination as to what applications will be funded each year. Second, the capabilities of the existing shared IT infrastructure serve as the starting point for new business applications. Business managers claim to look for ways to leverage the infrastructure when they propose new IT applications and business processes.

RENEWAL

IT-investment practices at UPS are not a matter of writing blank checks for infrastructure overhaul and conducting an annual review of project charters. Managers also focus on

upgrading infrastructure technologies and positioning the company to seize new opportunities. To that end, UPS has adopted two additional investment processes. First, to refresh the IT infrastructure, it invests each year in CIO-led initiatives, replacing systems that are no longer supported by vendors and upgrading technologies to improve reliability, reduce maintenance costs or expand functionality. UPS relies on technology standards to enhance interoperability of its technologies and contain maintenance costs. As new technologies offer new capabilities, the IT unit updates technology standards and then gradually implements them across the organization. With 344,000 employees in 200 countries, the migration to new standards can take several years, particularly when the technology is located on the employee desktop or in a UPS truck. UPS has found that staying current with technology requires a substantial annual commitment to refreshing its technology.

EXPERIMENTATION

UPS executives also allocate funds for IT research and development — for example, for testing new technologies to determine

when new capabilities are ready for prime time. A key focus is assessing scalability and interoperability; the IT unit does not install systems that cannot carry the weight of 13 million packages per day. When business managers identify IT capabilities that offer strategic value, the IT unit wants to be prepared with an approved technology to meet the need on a UPS scale. UPS also funds experiments — for example, an e-Ventures unit for testing e-business opportunities.

THE BOTTOM LINE

IT-investment practices at UPS have enabled it to take advantage of several new business opportunities. Using information technology aggressively, UPS exchanges 88% of all transactions and package information electronically. At the same time it has reasserted its leadership in its industry.* A key factor in that success is its IT-investment practices, which meet both short-term and long-term business needs while balancing the need to provide shared IT services for global business with support for specific business processes.

* In 2000 UPS was named by Fortune magazine as both America’s and the world’s most admired mail, package and freight company and by Forbes magazine as company of the year.

CIO's responsibility. Process owners should not fund renewals of technologies that are expensive for IT to support unless they accept responsibility for achieving the expected IT-service efficiencies. Similarly, responsibility for transformation investments must be located with those who will compel the necessary process changes.

As they invest in all four types of IT initiatives, senior managers cannot rely on a series of business cases interrupted by an occasional executive handout. Instead, they need a pool of resources for each type of investment. That raises two issues: how to distribute funds across investment types and how to establish priorities within investment types.

Distributing Funds Across Investment Types

The process of distributing funds across investment types demands a vision for how IT will support its core business processes.⁸ UPS has defined four core processes: customer-relationship management, customer-information management, package management and product management. And Delta has identified four: the customer experience, the operational pipeline, revenue management and administrative processes. At both companies the core processes are cross-functional and thus demand shared data and application integration. Accordingly, they drive the companies toward shareable, reusable platforms that make it easier to deliver applications and achieve cost-effective IT operations.

We believe that most companies constantly compare their existing-process-support capability with their desired capability. The comparison usually provides the initial basis for allocating funds to transformation, renewal and process improvement. In contrast, funding for experiments may depend more on perceived opportunities of new technologies and the condition of the infrastructure.

Companies that leverage IT effectively instinctively make distinctions similar to those described in our IT-investment framework. Staples has two main buckets in its IT budget — the baseline bucket and the new-applications bucket — with which it allocates funding for all four investment types. The baseline bucket funds annual IT operating expenses, including infrastructure renewal. So although renewal constitutes approximately 25% of IT spending at Staples, it does not compete with other investment priorities. Staples' new-applications bucket funds transformation, process improvement and experiments. Currently, a key objective at Staples is to move toward common processes and systems across business units. Annual transformation projects, totaling about 20% of new-applications spending, are incrementally building infrastructure components, such as portals, kiosks and help-desk facilities. But Staples is determined

to leverage its infrastructure as rapidly as it builds it. Thus, it allocates 40% of its new-applications budget to process-improvement projects that leverage the capabilities of the infrastructure to meet specific business needs. Staples allocates 15% to new capabilities, a category that includes experiments such as its initial forays into intranets and portals. The experiments do not compete for funding with process improvements or transformation investments. The percentages spent on each investment type reflect Staples' business priorities and its existing IT capability.

In contrast, a large insurance company has a funding portfolio that reflects its aggressive campaign to implement Internet capabilities for both independent insurance agents and end customers. (See "Allocating Funds Among IT Investment Types.") Compared with Staples, the insurance company is allocating considerably more of its IT spending on transformation to develop the infrastructure for its intended business change. It also is investing in process improvements that leverage that infrastructure. Consequently, its renewal and experiment percentages are less than Staples'.

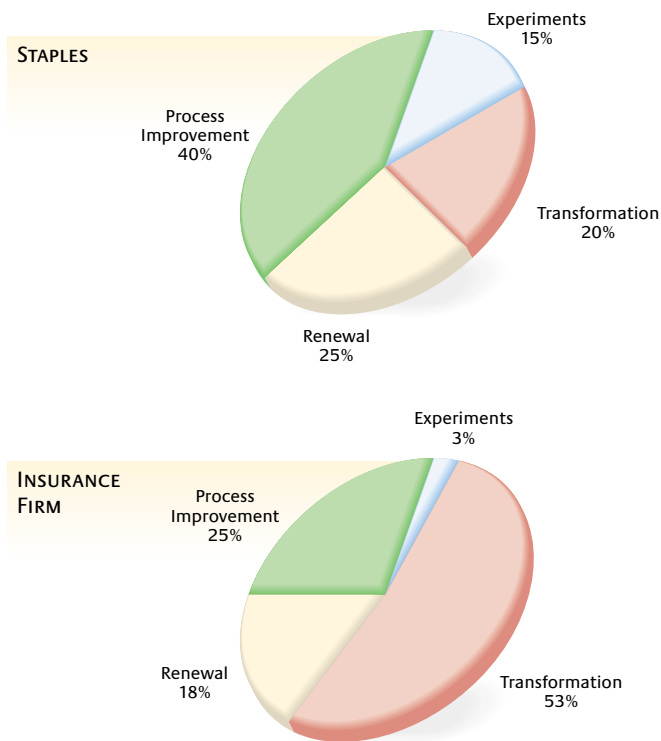
Prioritizing Within a Type

The second funding challenge is selecting projects within a type. No single technique can guide investment within all four types. Ways of prioritizing differ according to the investment's technology scope and business objectives.

Funding Transformation Investments in transformation create a basis for long-term growth, but their payoffs are not easily and quickly achieved. Their value does not come from installing the technology; it comes from changing both operating and management processes — perhaps operating and management cultures, too. Consequently, transformation investments demand significant senior-management commitment to invest the funds, guide implementation and process change, and steer the organization toward opportunities to leverage the investments.

Many companies will struggle with the necessarily large commitment an infrastructure transformation requires. Charlie Feld, Delta's first CIO, built the case for funding Delta's transformation by noting that much IT expense was hidden: "We spent hundreds of millions of dollars on the infrastructure, but we would have spent it anyway. When this money is being spent in departments and in divisions, it's being spent, it's just not being seen." Clearly, effective IT transformation starts with understanding IT costs in a company and applying principles of activity-based cost management.⁹ Quantitative tools such as decision-tree analysis or real-options analysis also can assist decision making, but ultimately most companies rely on competitive analysis and executive instinct.¹⁰

Allocating Funds Among IT Investment Types



Funding Renewal Most renewal initiatives reduce the cost and raise the quality of IT services and thus can be justified with traditional business cases. The IT unit responsible for the cost and quality of shared IT services would probably prepare the justification. For example, technology owners in Delta's IT unit regularly review the capabilities, limitations and operational costs of Delta's 50 key infrastructure technologies. When business needs or technology developments indicate that a standard technology is no longer appropriate, the technology owner develops a business case that supports replacing it.

Funding Process Improvement Process improvements that reach out to customers or back to suppliers are usually cross-functional and strategic. Thus they often are funded centrally. Segregating infrastructure investments from process-improvement investments helps companies identify which process-improvement projects depend on transformation investments. A dependency may dictate postponement of an initiative but will clarify the prioritization process for both process improvements and infrastructure initiatives. Again, funding process-improvement projects separately from infrastructure allows companies to clarify

the goals and expected returns of each investment alternative. With that separation in place, business cases that incorporate discounted-cash-flow analyses should provide valuable guidance.

Individual business units also have IT needs. Their projects typically do not require senior-management attention and are more likely to be funded locally. Delta and UPS have taken different approaches to addressing local process-improvement needs. Delta allocates a small allowance to individual functions to address whatever process improvements they find most compelling. UPS provides business units with clear standards for technologies and platforms, then it allows units to develop at their own expense applications that the central IT unit subsequently supports.

Funding IT Experiments Companies fund experiments in myriad ways, including out of the CEO's pocket (or the CIO's pocket) or from a business unit's budget. No one we talked to had figured out a way to put a value on the learning benefits so as to persuade a capital-budgeting committee to invest in experiments. Some researchers have argued for the use of real-options analysis to evaluate the learning benefits of pilot projects, and others have demonstrated the use of real-options analysis for ranking R&D projects.¹¹ For the foreseeable future, however, funding for IT experiments most likely will be based on the enthusiasms and intuitions of sponsoring business managers or specially funded organizational units, such as e-business units.

Developing New IT-Investment Habits

Instinctively, many senior-management teams have been supplementing or sidestepping traditional business-case arguments to justify their e-business infrastructures. But as dot-coms and e-business in general have lost their luster, companies might be tempted to revert to old IT-investment habits. The sustained importance of IT, however, argues instead for a new habit. Companies should formally establish four pools of resources and then avoid the temptation to underfund one or more of the IT-investment types. A massive transformation initiative or economic downturn could lead to temporary reduction in an investment fund, but both short-term profitability and long-term growth demand sustained investment in all four IT-investment types. The multipronged approach to IT investment is crucial for companies attempting to harness the power of IT in shaping business opportunities.

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