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Good Enough!
IT Investment and Business Process Performance in Higher Education

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Foreword

Irrational Exuberance

In May 2003, *Harvard Business Review* Editor-at-Large Nicholas G. Carr published an article titled "IT Doesn't Matter." Carr's article ignited a debate about the role, value, impact, and potential of information technology (IT). This debate continues with vigor fully two years later. Carr's article touched the nerves of chief executive officers who had been called into question by shareholders and industry analysts about the impact of IT investments on company performance. To many, "IT Doesn't Matter" looked like the exclamation point on the proclamation that the "New Economy" was dead.

Information technology has had a checkered career in the service of firms and organizations. Until recently, economists, investment bankers, and policy makers debated the so-called IT paradox. Nobel Prize–winning economist Robert Solow (1987) said that we see computers everywhere except in the productivity statistics. Indeed, productivity growth in the United States slowed in every decade since the 1960s, while investments in IT grew dramatically. Some took this paradox as proof that IT doesn't affect productivity. In the 1990s, a period of unprecedented creativity in computing was launched by the emergence of 1) the Internet as a widespread mass communication medium; 2) the World Wide Web as a means of linking textual "pages"; 3) the search engine; 4) the rapid reduction in prices of computer workstations; and 5) the adoption of a wide variety of technical standards. We witnessed the insertion of an "e" in front of nearly every area of human activity: learning, business, banking, and commerce. A New Economy was declared, an economy fueled by real productivity gains that were ascribed to computing and communications technologies. The future included exciting visions of convergence; plentiful (and cheap) broadband; 3-D Webs; and next-generation search engines that could link data, images, and other media.

Bursting Bubbles

By 2000, the party was over. The era of so-called irrational exuberance was followed by choppy and near-recession levels of economic performance, and the major productivity gains of the 1990s diminished. For some, the New Economy was indeed dead! In corporate IT environments, the challenge shifted from a preoccupation with placing an "e" in front of every firm activity to a focus on how to take the most money out of IT spending. Practices such as onshore, offshore, and near-shore outsourcing were widely adopted.

Along with the demise of the dot-com darlings of Wall Street came skepticism about the need for massive Y2K investments and the pain and expense of acquiring and installing new enterprise resource planning (ERP) systems. Chief information officers (CIOs) everywhere were under pressure (if not under siege) to demonstrate their value to the

"enterprise." Added to this were revelations of corporate excess and criminal conduct that led to the passage of new laws (Sarbanes-Oxley) that prescribed transparency in financial transactions, institutional accounting, and reporting. In this environment of increased scrutiny and accountability, many CIOs faced a tougher time selling institutional investments in new technologies such as portals, customer relationship management (CRM), and content management systems. Finally, Carr asked the question everyone dreaded: does IT matter? Was there, Carr implied, an elephant in the executive suite? In another sign of the times, in the October 15, 2003, issue of *CIO Magazine*, Stephanie Overby decried lower CIO salaries, slashed IT budgets, and the removal of CIOs from corporate boards and executive teams as the phenomenon of "the incredible shrinking CIO."

What About Higher Education?

Higher education was not immune from the early euphoria about IT, the creeping skepticism, or the subsequent disappointments. Indeed, the educational sector itself and the opportunities presented to it hovered near the center of the New Economy hype, as investment bankers at Merrill Lynch and the Bank of America produced tomes proclaiming the emergence of an exciting new for-profit educational market—with institutions including Temple University, New York University, Cornell University, and Columbia University making forays into these waters—and as Cisco CEO John Chambers proclaimed that e-learning's impact on network consumption would make e-mail look in comparison like a "rounding error." I described (1999) the herky-jerky tango of IT in higher education as a dance with the devil, and higher education's path from irrational exuberance over the new economics of e-learning to its subsequent disappointments over for-profit

e-learning was described in compelling and controversial terms by Robert Zemsky (2004) as "thwarted innovation."

Against this backdrop of exuberance and disappointment, ECAR studies have shown repeatedly that belief in the value of IT in higher education is widely shared among top leaders of colleges and universities.

Enter ECAR

The fellows of ECAR, especially the authors of this study, have long felt that the truth in the story of IT's contribution to the "business" of higher education likely falls somewhere between the New Economy promises of the mid-1990s and the thwarted innovation described by Zemsky. First, information technologies—particularly networking—clearly have transformed scholarly communications and research (National Science Foundation, 2003). For example, computational simulation and modeling have taken their place alongside theory and experimentation as methodological pillars of science. Second, ECAR fellows felt that IT and the organizations that support it had borne too large a share of higher education's hopes, dreams, and expectations. We suspected that disappointments over our institutions' seeming inability to "run like businesses" might be misplaced at the feet of IT leaders. Perhaps, we speculated, higher education does in fact run like a business; that is, the business of experimentation, discovery, learning, and community engagement. The fundamental questions that framed ECAR's curiosity in this domain were:

◆ Are higher education business processes performing well?

◆ Does investment in IT enhance the performance of these processes?

◆ What roles do culture, leadership, and other factors play in process performance?

◆ In sum, in their business aspects, do colleges and universities behave like businesses?

A Tough Nut

As ECAR fellows discussed this potential research topic, we were at once excited and horrified. From a business perspective, the framing questions as posed collectively represented the proverbial $64,000 question: does IT matter? In fact, this research begged even more vexing questions. Does culture matter? Does leadership matter? On the frightening side, we were mindful that it would be nearly impossible to devise a research strategy that would satisfy possible critics and that the political nature of the inquiry virtually assured the emergence of critics. Therefore, in solid research fashion, we declare the results of the study that follows to be preliminary. And in fact they are. Robert Kvavik, Philip Goldstein, and I are mindful of the inherent limitations of survey research generally and particularly of research that depends primarily on the analysis of the subjective impressions of one campus subculture (IT leadership). Having rejected any claim to Nobel Prizes, let me add my confidence in this research and most enthusiastically in our researchers. No data set has ever been so tortuous, or so tortured. As Kvavik commented to me, "every drop of nectar has been squeezed from these data." ECAR fellows are at once analytical wonks and, at the same time, profoundly skeptical of their own findings. Judith Pirani and Julie Ouska spent hours with dozens of our colleagues in conversations designed to amplify, verify, refute, or otherwise clarify our findings. They are careful listeners and bring texture and nuance to our work.

Herbert Simon, Take a Bow

The results of this study were simultaneously murky and obvious. What the data reveal at first is survey respondents' disturbing acceptance of "acceptability" in the performance of many of higher education's business processes. How could that be, we wondered. Weren't those of us who drank Michael Hammer's process reengineering Kool-Aid committed to excellence? The ECAR study *Good Enough!* reveals what Nobel Prize winner Herbert Simon taught us. Simon reshaped our understanding of decision making. Classical theory held that most behavior could be explained in terms of matching the utility of a decision against its costs. In this way, rational decision makers made optimal decisions. Simon argued (1965) that bounded rationality led decision makers instead not to look for optimal solutions, but rather to "satisfice"—that is, to settle for solutions that are "good enough," in the belief that better solutions would have to justify the extra costs carried in finding them. Satisficing, if you will, is the decision maker's conscious relaxation of rationality. *Good Enough!* revealed that higher education decision makers and process owners are in many cases satisfying themselves with business processes that perform only adequately. Importantly, the data show that student-related processes outperform others. Tomorrow's headline: higher education decision makers behave rationally!

As uneventful as this finding may appear, it is subtle and important. Within this finding is the kernel of an answer to that persistent question: "Why doesn't higher education act like a business?" In fact, in most ways it appears that higher education does act like a business, investing heavily in infrastructure and programs that produce scholarship and educated students, but cutting corners in areas deemed to be on the periphery. Indeed for many business processes, "good enough" can be translated as "in compliance"—nothing to brag about, but nothing that would tarnish the institution's reputation or embarrass its leaders. A long way from world class, but world class supply-chain management never vaulted an institution into the top echelon of higher education either!

IT Does Matter

The data in the study also reveal a complex set of decisions, behaviors, and patterns that underlie IT investment decisions and the relationship of these decisions to institutional processes. This is not a surprise and in fact is at the heart, I believe, of why an understanding of IT's value is problematic. Information technology, it must be known, is an enabler of change. IT is a necessary—if insufficient—variable in the construction of overall process or institutional performance. IT leaders can build a robust infrastructure, enforce rigorous project management, install contemporary applications, and deliver services pursuant to negotiated service level agreements (SLAs). Despite all of this, enterprise process performance can be merely adequate. The performance of processes, in the end, depends on the creativity of those who "own the business" and on a partnership between creative business owners and creative IT suppliers. Anyone can implement an enterprise course management system. Despite this, what is the state of higher education's processes to intervene with students to improve persistence, retention, and academic performance? Few deans, provosts, registrars, or vice chancellors for student affairs have worked with IT leaders to mine the data from these systems or from student information systems to build and test models of retention, performance, and persistence. Nor have they built a network of alerts for academic advisors who can intervene with students whose indicators suggest that they are in some way at risk. The point is that the performance of complex processes depends on an equally complex interaction of policy, process design, leadership, culture, and technology. The ECAR data suggest that while these factors do indeed matter greatly, efforts in higher education are directed primarily to processes that serve the institution's core purposes. Further, in environments characterized by shared governance between administrators and faculty, processes that directly impact research and students typically prevail. Satisficing.

Good Work Depends on Many Hands

As always, our ability to gain insight into the complex interactions of IT practitioners within higher education environments depends on the generosity and commitment of the EDUCAUSE community. Senior practitioners take time from busy schedules to take ECAR surveys and to answer our calls. We have never been turned down for a site visit, and in all cases, our colleagues share their time and that of their colleagues without hesitation. Robert B. Kvavik and Philip Goldstein are the principal investigators for this study and did the heavy lifting with their characteristic thoughtfulness and depth. John Voloudakis, now with BearingPoint, crafted Chapter 8 on the future of business process performance and was instrumental in the development of the survey instrument. He is frequently the ECAR voice of industry who forces us to understand how corporations behave in areas of ECAR inquiry, lest we get too comfortable with our understanding of the current state of higher education practice. Julie Ouska, late of Mercy College and now with SunGard Collegis, and Judith Pirani made significant contributions to the study through qualitative interviews and a review of the literature. Our colleague Mark Nelson, now with the National Association of College Stores, contributed in important ways to the literature review and to our understanding of the literature.

There are too many campus colleagues to thank, and our acknowledgement of individual contributions of these friends in the appendices is not adequate. We will make it up to you. Last we thank our colleagues at The City University of New York and Iowa

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State University for hosting ECAR researchers and for offering their experiences as case studies for the benefit of the community. And of course, the creation of a highly readable study depends on Toby Sitko's choreography of a great production team. She and Barbara Hey work with our colleagues within EDUCAUSE and with a first-rate team of external layout artists and printers to make this final product what it is. It is a privilege and a ball to work with great people.

Richard N. Katz
Boulder, Colorado

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Executive Summary

What return has higher education received for its sizeable investment in improving its business processes? That was the core question this study set out to answer. Further, have all the gains been wrung out of administrative process improvements, or are there higher levels of process performance that can and should be attained? Should investments continue to be made in administrative technologies to create process improvements? Which technologies have the greatest promise and impact on process performance? And are there additional gains to be had from existing technology, and how can they be harvested? Our answers are based on quantitative and qualitative data provided by respondents at 335 higher education institutions in the United States and Canada.

Since the 1990s, higher education has invested heavily in business process reengineering supported by new technologies—hardware and software—with the objective of improving services and reducing costs. It was expected that the investments would be repaid in short order through administrative and purchasing efficiencies. However, the savings never materialized. Process improvement efforts grew both in their promise and their cost, reaching an apex with ERP implementations. ERP implementations combine a wide-scale deployment of new technology with the redesign of business processes.

Now that we are arguably on the trough side of the enterprise resource planning (ERP) wave, we can look at the results. On first read, the findings of this study of business process performance in higher education appear disappointing at best. For most business processes, institutions report that their performance is somewhere between adequate and satisfactory. Very few report process performance that is exemplary.

Is this what higher education expected of its investment in process performance—process performance that is only adequate? Certainly, that was not the goal articulated by many institutions on their ERP planning documents or reengineering Web sites. Is Nicholas Carr right that IT doesn't matter? Is it possible that for higher education administrative processes do not matter? Is it that university administrators and staff are uninterested or resist change? Or, is there another explanation?

Optimizing Versus Satisficing

In designing this study, we sought guidance in literature on business process performance and innovation. One objective was

to identify and catalog exemplary practices and explain where and how improvement of business processes takes place. Appendix D provides references for further reading on innovation and business process performance. A brief review of the literature is found in Chapter 3.

In the study, we looked for both technological and administrative innovation and optimization of business process performance. Technological innovation includes the adoption of new technologies such as ERP systems or course management systems (CMSs). Studies of technological innovation focus on which technologies are adopted, rejected, or accepted within organizations and reasons or processes that influence successful or failed adoption (see Chapter 6). The study of administrative innovation is similar, but focuses on the adoption of new business processes or new ways of doing business (see Chapter 7). Typically administrative innovation lags behind technological innovation, which we have repeatedly learned in ECAR studies of ERP, IT security, and classroom technologies. As John Curry (2002) aptly notes: efforts to improve business process performance was a "technological rather than organizational triumph, more a testimony to the skill and tenacity of programmers and information technology staff members than to the change management prowess of us leaders and managers."

The initial focus on maximizing business process performance and innovation, while not wrong, masked a bigger story—satisficing. In all candor, we did not start this study with Herbert Simon's concept of satisficing in mind but after looking at the data and analyzing it, it became very clear very quickly that Simon's Nobel Prize–winning theory applies squarely to the behavior of higher education and business process performance. (Simon, 1965). Satisficing describes a situation where people accept a solution to a problem that is "good enough." Decision makers do not seek the best possible solutions to problems because they necessarily operate within what Simon calls bounded rationality, which is attributed to uncertainty about the future and the costs of acquiring information in the present. Under these circumstances, rather than seeking an optimal or maximum solution, decision makers settle for one that is satisfactory.

Simon argues that individuals assess whether the benefits promised by the optimal solution outweigh the costs of discovering it. If not, they settle for a solution that meets their basic needs. They satisfice! Simon argues that it is often rational to satisfice because the process of looking for better solutions expends resources without a certainty of outcome. Pursuing a better solution must justify the extra costs incurred in trying to find it.

Does higher education "satisfice," e.g., accept what it determines to be good enough, as opposed to finding the best possible solutions to problems? Under what circumstances and with which processes do they seek to optimize or satisfice?

Processes Studied

The activities of a college or university can be broken down into hundreds of individual business processes. Some business processes are narrow and localized in a single department or even one individual's job. Others cut across organizational boundaries and can involve the work of many employees and students.

The full range of higher education processes were too broad for us to study. Also, higher education has not invested equally in the improvement of all of its processes. For those reasons, we selected a subset of higher education processes using three criteria for inclusion:

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◆ Processes that have been recipients of significant process improvement attention;

◆ Processes that have been impacted by higher education's investment in ERP, the Web, and other enabling technologies; and

◆ Processes that are used by most if not all institutions.

The processes reviewed and levels of performance are described in Chapter 4.

What we found about business process performance can be summarized as follows:

◆ Respondents report that their process performance overall ranges between adequate and satisfactory.

◆ Respondents achieved higher levels of performance with their transactional processes than with monitoring or managerial processes.

◆ Respondents report the highest level of performance for student processes and the lowest for grants management and management information and analysis.

◆ Three of five grants management processes were reported "at risk" by at least 20 percent of respondents.

◆ Nine student processes of 20 were reported as "leading" or "exemplary" by at least 10 percent of institutions in this study.

◆ Institutions have sought to be leaders most frequently in the student services area, and especially with processes that impact recruitment and retention.

◆ Respondents are most satisfied with reporting for enrollment management and least satisfied with reporting to support management of the workforce.

Process Framework

In the context of this study and in the light of these findings, we believe we are observing the application of Simon's theory to process improvement. Institutions have determined that for many, if not most, business processes, satisfactory performance is the appropriate goal. For many respondents in this study, administrative excellence is achieved by putting in place commodity processes that perform satisfactorily and are not at risk. Raising the floor, usually with new software enhancements, rather than raising the ceiling constitutes improvement. Concomitantly, it is prudent not to over invest in nonstrategic processes but rather to invest in a targeted way in strategic processes.

To further illustrate this concept, we plotted the processes in this study along two dimensions. The first dimension or continuum is the breadth of political engagement in the process. In other words, the potential resistance to change. Processes with low levels of political engagement are typically controlled locally. A senior administrator such as the chief financial officer normally manages many business processes that involve little or no political engagement outside of his or her office. His or her office manages the processes. High political engagement usually accompanies processes with diffuse ownership. For these processes, many units or individuals have or perceive ownership or control. Diffusion is typical of many universities, and the problems that come with it are well described by John Curry (2002). "Within every business process lurked personal territories, local traditions, someone's meaning of life, and bragging rights. For every new professional expectation envisioned by central administrators, there seemed to be a dissonant departmental service expectation defined by faculty members. With each new touted capability of an enterprise system came defenses of…shadow systems for their unique service to a unique clientele." To create change in a process where the community is highly engaged is by definition difficult and costly, both financially and in terms of political capital.

The second dimension pertains to the strategic value of the process. At one end of the spectrum are processes for which external

bodies mandate or prescribe how the process should be performed. These processes are like commodities. At the other end are processes that offer an institution a potential for strategic differentiation among competing institutions if they can achieve high levels of process performance.

Together these two axes produce the two-by-two matrix presented below (see Figure 1-1). We used the matrix to formulate our hypotheses regarding the process performance we would expect to see in each quadrant of the matrix.

Adequate Is Appropriate

We found that many institutions were more likely to achieve process performance that was satisfactory or adequate in Quadrants 1 and 2. For these processes, the incremental benefits of achieving further process improvement were deemed low or nonexistent. Conversely, the incremental cost of further improvement either in dollars or political capital (especially for Quadrant 2) could be high. Satisficing rather than optimizing is a rational decision.

Many institutions report that their processes are adequate and that they have no intention of further improvement. For the most part, these are commodity processes that offer an institution little opportunity for differentiation even if they are executed optimally. In many cases, the performance of the process is significantly constrained by a regulatory environment that constrains the opportunity to innovate. For such processes, achieving adequate performance is a highly rational decision.

Few would argue that it would be beneficial for their institution to have a process to create new accounts that would be an exemplar for the industry. In fact, no institution in the study reports having an exemplary process in this area. For this process and others like it the vast majority of institutions have satisficed.

Some noteworthy findings include:

◆ Transactional processes especially in HR and finance had the least variability among respondents.

◆ Grants management and management information and analysis processes are
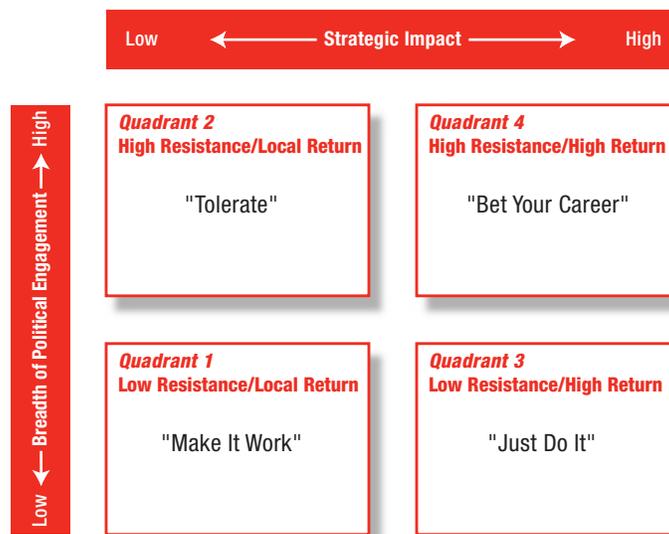
**Figure 1-1.
Business Process
Taxonomy**

undergoing the greatest amount of change.

◆ Despite the low rankings respondents gave to their grants management processes, only one grants management process (track budgets) was in the top six processes undergoing change.

In a regression analysis, the factors that stand out across the board and for all areas are diminishing returns and lack of alignment of technology and business processes. This may confirm why so many respondents cluster in the middle of a normal curve ranging from being at risk to exemplars, indicating a level of satisfaction with a majority of the business processes at their institutions.

Selective Excellence

Conversely, processes in Quadrants 3 and 4 demand a different solution. For these processes, there are further benefits to be harvested from being a leader or exemplar. We found that processes in these quadrants had both higher levels of performance and more variability among institutions. The processes in these quadrants are mostly student services, which were among the highest performing in the study.

Processes that have a direct impact on revenue and reputation also received much attention. Student advising, degree audit, and recruiting applicants were among the highest performing processes with relative more institutions reporting that they were leaders. The perceived benefits of optimal performance justified the increased cost of pursuing an optimal solution.

We also found that some institutions did not always try to optimize or even satisfice. For example, the grants management area achieved the lowest process performance scores despite its strategic importance to many institutions. In fact, a significant number of institutions reported that their grants management processes were at risk. Note

that by at risk we mean a sign of trouble ahead and not a conclusion that the institution is currently in trouble. Presumably, the difficulty of changing these processes is so great that many institutions have not achieved a desired level performance, and very few have achieved optimal performance.

Rationalizing Technology Investments

Whether optimizing or satisficing, we found that technology does matter. Respondents identified ERP systems and the Web as significant contributors to process improvement. The tools used varied by functional area. Financial processes tend to benefit most from an ERP system. Student processes followed closely by grants management and HR benefit most from Web self-service technology. As expected, business intelligence tools are most important to management reporting processes.

Some key findings include:
◆ An ERP system (80.5 percent) and Web self-service (68.1 percent) were used most often to improve process performance by institutions that reported themselves as leaders or exemplars.
◆ ERP systems are used most to improve business processes for finance (more than 33 percent), followed by HR (27.7 percent), and student (27.5 percent).
◆ The Web was used most often to improve student processes, followed closely by grants management and HR processes.
◆ A regression analysis across all process areas reveals that use of the Web was overall the most significant technology factor.

Technology does in fact matter. However, if we view technology investment decisions through the lens of satisficing and the business process framework, we see different investment guidelines. For commodity processes, institutions must have in place a core technology capability that supports

basic business requirements (e.g., an ERP). There is little to be gained by investing in additional technology to optimize these processes. Institutions should employ the minimally required technology and implement at minimal cost.

Conversely, strategic processes offer incremental benefits that likely justify greater investment in technology. One of the three most important factors in differentiating institutions with high process performance was technology, but alone it is not enough. Institutions also require leadership and a service culture that enables them to change their business practices. An institution that invests in technology capabilities that outpace its determination or capability to alter its business processes will have overspent on technology.

We found that:

◆ Leadership, planning, and technology were the top three factors that respondents report contribute most to process innovation at their institution.

◆ The ability to leverage employee suggestions was the most significant factor in determining institutions' process performance.

◆ The effective use of technology and the ability to forge improvements across functional areas and measurement were the most important factors in differentiating process performance among institutions.

◆ Carnegie class is not a significant factor in differentiating institutions' process performance.

In conclusion, leadership and culture seem to exert more influence on process performance than do technology and process management. Interestingly, listening to staff recommendations seems to be a particularly efficacious leadership strategy or cultural value.

A New View of Higher Education's Process Portfolio

Colleges and universities are under unrelenting pressure to behave like businesses. Many institutions have at one point articulated a goal of achieving administrative excellence. Often, this goal is defined as the need to achieve excellence in all administrative activities. This may be a misplaced and unnecessary goal for higher education. What this study shows is that the quest for administrative excellence is more complex.

We offer a multifaceted definition of administrative excellence. Institutions that achieve high levels of process performance combine the following strategies:

◆ Optimize the performance of business processes that make a strategic impact on the institution;

◆ Conserve resources by maintaining adequate performance for processes that are commodity processes;

◆ Ensure that no process is at risk;

◆ Recognize that what is required to be adequate or optimal is not static, and commit to continuous improvement usually by raising the floor with new software improvements;

◆ Foster a culture of improvement by engaging employees in the process of identifying and implementing process improvements; and

◆ Rationalize technology investments by:
  ◆ Supporting commodity processes with commodity technology; and
  ◆ Making targeted investments in differentiating technologies in areas that offer strategic benefits.

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Introduction

History never looks like history when you are living through it.
—John W. Gardner

In the current environment of tight budgets and high customer expectations, higher education institutions are pressed more than ever to improve the ways they do business. Institutions have expended significant time and resources on process improvement in order to realize cost savings, to improve services to their clients, to reduce business risk, and to attain greater accountability. It would be rare to find an institution that has not engaged in some business process improvement project.

Many institutions pursued formalized improvement methodologies such as benchmarking, total quality management (TQM) and business process reengineering (BPR). Others took a less structured approach. Some focused significant efforts on redoing their processes in advance of implementing new technology. Others found opportunities to change processes while implementing new technologies. Still others deliberately avoided any aggressive process or organizational change until they had completely revitalized their information systems. While each approach has its own unique pros and cons, they are all valid.

This chapter traces the history of process improvement in higher education. It considers how improvements in technology and process have converged and where institutions are today in their approach to improving process performance. Finally, it indicates the questions about process performance that guide this ECAR research study.

Process Improvement— A Look Back

In 1990, Michael Hammer challenged enterprises of all kinds to "use the power of modern information technology to radically redesign business processes to achieve dramatic improvements in their performance." Hammer's work ignited a period of intense reengineering, and it did not take long for the reengineering phenomenon to sweep higher education.

Business process improvement was not new to higher education. Before BPR there were TQM and just-in-time (JIT). These methodologies, tools, and/or philosophies guided institutional attempts to improve work processes. We would note, however, that faculty are innately skeptical of business sector tools and methodologies. Accordingly, many higher education institutions followed what we would call "applied common sense." They simply tried to do what seemed would work best to make things better.

Reengineering changed several important aspects of process improvement efforts:

◆ It introduced the concept of the end-to-end business process, which drove institutions to work to improve processes across departments and not only within a single department;

◆ It increased expectations for improvement. BPR challenged institutions to move beyond incremental improvement and to seek more substantial gains in productivity, efficiency, and cost-effectiveness; and

◆ It set the stage for ERP. While BPR drove institutions to first redesign processes before automating them, it also illuminated the many deficiencies in the legacy systems of most institutions.

Process Improvement and ERP

Reengineering initiatives for most institutions began in the early 1990s, peaked in the mid-1990s, and then were subsumed under larger ERP implementation projects in the late-1990s and thereafter.

Process redesign quickly exposed a need for a much greater technology capability. This coincided with a general aging of the industry's legacy finance, human resources, and student information systems. As a result, the industry's attention shifted to the implementation of new administrative systems, and the goal of process improvement was incorporated within ERP projects.

According to Joel Hartman, vice provost for information technologies and resources, University of Central Florida (UCF), "UCF previously used homegrown legacy systems based on COBOL and VSAM. It was clear in 1995 that a dynamic and growing institution would have difficulty surviving in such an environment: our programmers couldn't keep up with changing business requirements. In 1996 UCF began a comprehensive process of implementing a major vendor's ERP system, including a portal. The goal was to install a foundation based on a modern ERP environment, but changing the business processes is the real story."

Institutions adopted a variety of approaches to integrating process redesign and ERP.[1] Some institutions engaged in lengthy efforts to redesign processes before implementing a new ERP. These institutions were motivated by a desire to challenge their institutions to think differently about how to do business before configuring new software. They sought to avoid paving the cow paths. The trap that some fell into was spending too much time redesigning processes in detail before they understood the capabilities of the software purchased. This often created a perceived need to customize software.

Others chose to redesign and implement simultaneously. These institutions challenged their project teams to think of ways to improve processes and leverage the existing capabilities of the software they were implementing. In many cases, the institutions were counting on the best practices already built into their ERP software. Many institutions succeeded in improving processes in this way. However, some who took this approach found that their projects were getting bogged down as they attempted to build consensus for new process designs when they needed to be moving quickly to keep the ERP implementation on track. This inevitably led to missed deadlines and cost overruns.

Ahmed El-Haggan, vice president of information technology, CIO, and professor of computer science, Coppin State University, supports this approach. "CSU had good processes and policies in place, but our ERP implementation was an opportunity to reinvent and reexamine our processes. From the beginning we made a decision not to modify the ERP system unless it was federally or state mandated, statutory, or a system-wide policy. Otherwise we would adapt ourselves to the system."

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Most attempted to install their ERP systems first and then go back and redesign processes when necessary.[2] They, too, were counting on leveraging the best practices that would come "built into the software." They were sensitive also to their organization's ability to absorb change. These institutions believed that if they focused first on getting the technology installed and then redesigned, they could keep their expensive ERP projects on track.

This proved to be a successful approach for many. The new technology did bring improved business processes through its ability to automate previously manual transactions. After implementation, additional redesign work was performed when the staff was more familiar with the capabilities of the software and the time pressures of implementation were past. At the College of Saint Benedict/Saint John's University, they attempted to install their ERP systems first and then tried to redesign processes when necessary. Jim Koenig, director of IT services, noted that the institutions tried to do business process redesign as a part of ERP implementation, but found it was too distracting. In addition, most participants were reluctant to commit time to the redesign until they were fully aware of the capabilities and idiosyncrasies of the technology—something that would not be known until many weeks of training and testing were completed.

A few lucky institutions were so young that no legacy systems existed before their ERP implementation. One such institution is California State University (CSU), San Marcos. Wayne A. Veres, dean, instructional and information technology services and CIO of CSU, San Marcos notes that "before we implemented Banner we had nothing—not even a mainframe environment or data centers where users picked up reports. Today we have centralized IT support and decentralized technology experts for the business areas.

Users learned upfront how to use sophisticated query tools in Oracle databases to produce their own reports."

Some institutions discovered that one of the greatest features of ERP—flexibility—was also a curse. The software proved to be flexible enough to support a bad process design as well as good one. Project teams were often tempted to use the software to replicate existing processes (even in cases where a more efficient method could be supported without customization). Or, institutions lost their focus, energy, and funding, which are necessary if an institution wants to go back after the implementation to continue to improve business processes.

Not every institution pursued an ERP implementation as part of their process improvement strategy.[3] Some were able to continue to use their legacy systems. As Richard Spencer, executive director for IT strategy, The University of British Columbia, notes, "Our in-house development team maintains our state-of-the-art system. Our current capabilities might not have been feasible with a vendor ERP system." Others like the University of California, San Diego, spent their efforts improving services, rather than implementing an ERP system. They invested significantly in Web-based services and in Blink, the university's portal.

These institutions were some of the pioneers in offering self-service capabilities to students, faculty, and staff. They streamlined processes significantly at the point of interaction with the customer. Some were less successful improving the performance of back-office processing until they upgraded their legacy systems.

Evolution of Process Improvement Efforts

We describe the history of process improvement in four stages. Each phase is different as summarized in Table 2-1.

Table 2-1. Process Improvement Phases

Phase	Characteristics	Comments
1. Localized process improvement	Focus on processes within a functional department Change processes by simplifying work steps and rationalize policies; improve form design, altering office layouts Improve hand offs to other offices Historical roles and responsibilities are usually retained	Focus on incremental improvements
2. Reengineering	Focus on processes from end to end Change processes by eliminating work steps and alter policies Seek to eliminate hand offs between offices Historical roles and responsibilities change significantly	Some designs are left on paper due to a lack of technology solutions
3. System-enabled process improvement	ERP or new system is catalyst for process change Redefine end-to-end process using the automation and workflow capabilities of the software Sometimes accompanied by a rethinking of policy and organizational roles and responsibilities Begin to decentralize work to the end customer	Results can vary depending upon approach
4. Post-system implementation process improvement	Emphasis on using the Web to promote self-service Shift entire responsibility for processing out of some central departments Focus on using technology to automatically trigger services Need to rethink policies and division of responsibilities between offices still persists	Many opportunities are available to harvest additional benefits from existing technology

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Many institutions began their process improvement initiatives in the finance area. This area is often under the direct control of the chief business officer, who at many institutions is a primary champion of process improvement. Especially noteworthy were efforts to model process improvement efforts on methodologies first used by corporations. Iowa State University (ISU) provides a good example. Warren Madden, vice president of business and finance, led ISU's evolution from TQM to the Integrated Projects Program, an initiative using a formal methodology to evaluate, select, and implement enhanced business processes, focusing primarily on processes that cross departmental lines.

As time passed and process improvement methods became more accepted and familiar, institutions turned their attention to additional process areas, creating a cascading effect throughout the institution. Mark Cain, CIO, Cincinnati State Technical and Community College, notes, "IT has a lot of little pieces that you put together like a mosaic. If you do it right, it becomes a nice picture. If you do it wrong, it is a mess or there are some shards lying on the floor. So when I am planning—as for example Web-based student services—there are services and processes that leap logically to mind if you extrapolate from where you are to where you want to go." Maury Hope, director of administrative technology services, ISU, notes that their original goal was to create a Web-based transaction workflow that could be used across multiple departments. The purchase requisition was the first successful implementation. This verified the concept and set the stage for the controller's office to lead an initiative to improve the process for travel reimbursement. This success is now driving additional process improvement projects involving better workflow across other departments.

Many institutions focused on student services because of its strategic importance.

Others looked at select human resource processes such as hiring or payroll. Because of the complexity and the broad set of influential stakeholders, administrative support processes for research and teaching were less frequently the focus of broad reengineering efforts.

Once ERP became the dominant force in process improvement, the scope of the technology implementation often dictated the scope of process improvement efforts. Understandably, most institutions began to focus all of their process improvement efforts on those business activities directly impacted by the software modules being implemented. This was necessary to complete the implementation of the ERP system. It also reflected the reality that ERP implementation tended to consume most of the resources and management attention that otherwise would have been available to improve non-ERP business processes.

Over time, institutions changed the focus of their process improvement efforts as well as their approach. Wayne A. Veres of CSU, San Marcos, articulates one transition. "For us, our Banner implementation in many ways is done. We'd like to move beyond and do other things to enhance our institution, as for example, implementing more sophisticated customer service models."

The University of Minnesota, with its ERP systems stable and fully implemented, is turning its attention to promoting greater administrative efficiency and effectiveness by standardizing institutional processes and technologies across all of its campuses, reducing redundant systems and processes, and optimizing organizational structure and alignment. The financial advantage of uniform systems, processes, and tools is perceived to be the removal of the premium paid for unnecessary duplication and complication.

Now business process improvement has the potential to truly transform the organization. According to the Gartner Group (2005),

"Business process improvement has been a focus for the IS organization for 20 years. However, it is no longer about making individual processes within a business unit or geography faster," states Mark McDonald, group vice president, Gartner Executive Programs. "The latest wave of business process change, business process fusion, provides the opportunity to reengineer processes end-to-end from the customer perspective and integrate previously autonomous business processes, information, and application software across business units and geographies."

The University of Minnesota has moved to transform the institution by focusing on its service culture. As the university is working to transform processes, equal attention is being paid to its service culture. The university's culture, its attributes, behavior, and expectations are being redefined and inserted into job descriptions. It is aligning training, work plans, performance evaluations, rewards, and compensation with its cultural expectations and instituting continuous performance reviews of all service and support units. A redefined culture is key to business process improvements.

As institutions move to business process improvement, they will reap the benefits. For example, Kathleen O'Kane, associate director of undergraduate admissions and student systems manager, UCLA, notes: "We moved to provide, as much as possible, students' information at that same junction. It resolved several issues, provided better information for the students, and addressed an institutional goal to provide the appropriate information to help students move through our institution in a more expedient manner." Elazar Harel, assistant vice chancellor for administrative computing and telecommunications University of California, San Diego (UCSD) notes that while UCSD's student enrollment and research activities have grown substantially, the number of administrators has not. Automation and process streamlining are the main strategies that allow the growth to continue without increasing staff.

Why Study Process Performance?

The state of process performance is worthy of analysis for several reasons. First, it is becoming a higher priority for institutions. For example, the META Group (2005) observes that "Smart organizations increasingly are turning to technology and business process innovation to gain competitive advantage. Gartner's Mark McDonald, further notes, "Business expectations are forcing CIOs to transform the IS organization and 2005 is the year where CIOs must deliver more value and become a contributor rather than a commodity. They must do this without large up-front investments and CIOs are turning to business process and business intelligence to meet this challenge."

Recent research supports this view:

◆ Gartner Executive Programs' 2005 survey of 1,300 CIOs noted that business process innovation ranked number one of respondents' top-10 business priorities;

◆ A 2004 survey by the META Group (2005) noted that 79 percent of those surveyed indicated they would be targeting business process capabilities as a focal point for improvement over the next two years; and

◆ The same survey showed that the majority of CIOs concur that over the next two years, the aspect of their role that is anticipated to grow is that of change agent.

"CIOs believe that business process improvement and strategic use of business intelligence will be most significant in delivering IT's contribution to business growth in 2005–2008. Pressure for greater profitability, faster innovation and growth requires enterprises to be more agile. That means

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doing things better, not cheaper and faster. These pressures force a move towards business process improvement and integration." (Gartner, 2005).

As a result, "information utilization, and not its production, will become a new focus and core competency of the newly innovated IT function. Acting as business owners, IT professionals will ensure their tools are used to drive growth through innovation, transforming the IT leader function." (Strativity Group, 2004) "Given the IT organization's end-to-end view of business processes, it is no surprise that CIOs are gaining responsibility for supporting business transformation," said C. D. Hobbs, (2004) now president and chief operating officer of META Group. "Effective business transformation depends on an executive's ability to impact work routines by changing business processes that define how work is done. The CIO has unique knowledge and insight valuable for business process management, reengineering, and/or reconfiguration—all with the potential to alter culture in positive manner while responding to market imperatives…CIOs must master and be prepared to deliver the transformational capability of the IT organization (ITO) across the enterprise to sustain the improved credibility of the ITO gained in the first few years of this century."

Indeed, Gartner predicts that by 2009 the management of business processes will supersede management of technology as the leading value contribution for more than 50 percent of blue-chip IT departments (2005).

Where does higher education fit into this scenario? Why is it worthy of study? First, the higher education sector has invested considerably in pursuit of process improvement. While no comprehensive data are available, anecdotal evidence suggests that campuses have spent tens of millions of dollars collectively in pursuit of process improvement.

Our study finds that two-thirds (65.7 percent) of the survey respondents agreed or strongly agreed that their institution's strategic plan called for high performance in their administrative processes. Fifty-four percent agreed or strongly agreed that their institution effectively used technology toward that end. But planning was not matched by performance. Only 40.6 percent agreed or strongly agreed that business process improvement occurred frequently at their institution and barely one-third (33.4 percent) indicated that it occurred throughout the institution. It appears that business process improvement is often a series of localized events as opposed to wholesale improvement. We want to understand why. It seems that higher education is satisficing as opposed to optimizing. Our respondents as a whole do not suggest either a "state of excellence" or even a "quest for excellence" in many process areas.

Second, process performance is vitally important. The pressures that drove early process improvement efforts are still here today. In fact, most institutions face even greater pressure to meet high customer service expectations, to redirect resources from administrative to academic purposes, and to increase productivity in response to reduced budgets.

And third, significant investments have been made in technology to support improved business processes. Yet, no one is certain whether these investments have paid off. Did technology play an integral role in improving process performance? Did higher education pave the cow paths? Or, was IT not a factor at all?

Higher education has reached a crossroads in its administrative processes and technology. Institutions are wrestling with several interlocking issues. Among them are:

◆ Have all the gains been wrung out of administrative processes, or are there higher

levels of process performance that can and should be attained?

◆ Should investments continue to be made in administrative technologies to create process improvements?

◆ Which technology or technologies have the greatest impact on process performance?

◆ Are there additional gains to be had from existing technology, and how can they be harvested?

ECAR Research Questions

With these questions as context, ECAR designed this study of the state of business process performance in higher education. Specifically, we were interested in three broad areas. First, we wanted to understand the status of higher education's major administrative processes. Second, we wanted to ascertain what role technology has played in producing high performing processes. Third, we sought to examine what separates institutions that achieve higher levels of business process performance from those that do not.

Our more detailed research questions included:

◆ Which administrative processes have attained the highest levels of process performance and which the lowest? What is the state of the industry as a whole?

◆ Are there business processes for which average performance is an appropriate objective?

◆ What difference do technologies make? Specifically, what role did the ERP system play in driving the institution to higher levels of process performance? What role does the Web play in process performance? What about reporting technologies?

◆ Are institutions still pursuing process performance improvement? Where? Why?

◆ What differentiates institutions that achieve high levels of process performance from those that do not?

◆ How important is leadership, institutional culture, and performance incentives?

◆ What are barriers to process improvement?

The next chapter defines the processes that were analyzed and describes in detail the methodology used to guide the research.

Notes

1. Kvavik, R. B., Katz, R. N., with Beecher, K., Caruso, J., King, P., Voloudakis, J., et al. (2002). *The promise and performance of enterprise systems in higher education.* Boulder, CO: EDUCAUSE Center for Applied Research. (For a thorough overview of ERP implementations in the United States and Canada)

2. Ibid., p. 52, Kvavik, R. B., et al., found that only 13 percent of 535 institutions chose to reengineer in advance of or during implementation.

3. Ibid., pp. 38–41. (For a perspective on why institutions chose to remain with legacy systems)

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3

Project Design, Research Team, and Methodology

If you torture data sufficiently, it will confess to almost anything.
—Fredric M. Menger

This chapter presents an overview of the study's project design and research methodology. First, we discuss definitions and framing questions extracted from a very extensive literature that elaborates upon business process improvement and innovation. Second, we describe and define business processes studied and explain why they were selected. Third, we provide a framework for understanding each process's relative impact on an institution and barriers for improvement. This framework is central to our study and we use it to articulate many of our research hypotheses. And fourth, we present the quantitative and qualitative approaches we used to gather data and conduct our research and analysis.

Innovation and Business Process Performance

Our study focuses on business process performance and only indirectly on innovation. We recognize that in many instances, significant improvement in business process performance is a result of innovation. But improving business process performance is not dependent upon innovation. Nevertheless, studies of innovation inform this study.

There is extensive literature on business innovation (references can be found in Appendix D). R. L. Daft (1978), for example, defines organizational innovation as "the adoption of an idea or behavior that is new to the organization adopting it." A further and significant distinction is made in the literature contrasting technological and administrative innovation.

Technological innovation looks at the adoption of new technologies such as enterprise resource planning (ERP) systems or course management systems (CMS); at which technologies are adopted, rejected, or accepted within organizations; and at reasons or processes that influence successful or failed adoption. The study of administrative innovation is similar, but focuses on the adoption of new business processes or new ways of doing business. Typically, administrative innovation lags behind technological innovation, which we have repeatedly learned in ECAR studies of ERP, IT security, and classroom technologies.

Noteworthy, too, are studies that concentrate on the use of an innovation rather than the innovation itself, because use produces a better set of measures as to the value of the innovation to the organization. Moore and Benbasat (1991) include these characteristics:

◆ *Relative advantage*. The degree to which an innovation is perceived as being better than its precursor

◆ *Compatibility*. The degree to which an innovation is perceived as being consistent with the existing values, and past experiences of potential adopters

◆ *Ease of use.* The degree to which the innovation is perceived as easy to understand and work with

◆ *Result demonstrability.* The degree to which individuals can identify and communicate the results or consequences of using the innovation

◆ *Image*. Prestige or individual visibility associated with participating in the innovation

◆ *Visibility*. The degree to which the innovation is perceived throughout the organization.

◆ *Voluntariness*. The degree to which the adoption of the innovation was voluntary or required of those affected

Lastly we reviewed studies of how technological innovation and administrative innovation affect one another. According to Pennings and Buitendam (1987), for example, "the meshing of new technology with organization design, process, strategy, and external relationships appears to be one of the most important issues of the next decade." Indeed, "the complex issues surrounding the transformation of business at such a fundamental level require the simultaneous development of both business methods and the technology that supports these methods. This is the seedbed for a new discipline that industry and academia are coming to call services science."

Services science merges technology with business processes and organizations, a combination of recognizing a company's pain points and an understanding of the tools that can be used to correct them. To thrive in this environment, an IT-services expert needs to understand how that capability can be delivered in an efficient and profitable way, how the services should be designed, and how to measure their effectiveness. (Horn, 2005)

Process Definitions

The activities of a college or university can be broken down into hundreds of individual business processes. Some business processes are narrow and localized in a single department or even one individual's job. Others cross organizational boundaries and can involve the work of many employees and students.

In 1998, the National Association of College and University Business Officers (NACUBO) published the article "Navigating the Process Labyrinth: A Process Model for Higher Education" (Blustain, 1998), in which the author identified 123 major processes performed at a typical higher education institution. Some were further broken down into four to five subprocesses.

The full range of higher education processes is too broad for us to study. Also, higher education has not invested equally in the improvement of all of its processes. For those reasons, we selected a subset of higher education processes using three criteria for inclusion:

◆ processes that have been a significant recipient of process improvement attention;

◆ processes that have been impacted by higher education's investment in ERP, the Web, and other enabling technologies; and

◆ processes that are used by most, if not all, institutions.

Not surprisingly, we elected to study major processes in financial management, human resources, student services, and grants management. It was our view that these areas most closely met our criteria. They were the focus of the majority of process reengineering projects. They were impacted all or in part by major ERP implementations.

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They have been the areas where institutions have moved aggressively to use the Web to promote self-service for faculty, students, and staff.

In addition, we included the category of management information and analysis. While some might argue that the activities selected are not purely business processes, we felt strongly that they should be included. Institutions are looking to improve management reporting and analysis because many see this area as a major benefit of their technology investments. Further, without effective business processes that can also capture requisite data, effective analysis in support of decision making is problematic.

For each category, we identified a set of major processes and developed a brief definition for each (see Appendix C for definitions). Table 3-1 lists the processes that were included in each category. In all, 48 processes were selected. In naming and defining the processes, we sought to use generic language that would be understood by our respondents.

Table 3-1. Business Areas and Processes

Category	Process
Financial Management	1. Develop budgets
	2. Create accounts
	3. Track budgets and expenditures
	4. Prepare external financial statements
	5. Purchase small-dollar items
	6. Purchase large-dollar items
	7. Pay invoices
	8. Fulfill check requests
	9. Receive cash
Human Resources	1. Recruit employees
	2. Hire faculty
	3. Hire staff
	4. Manage compensation
	5. Manage positions
	6. Administer benefits
	7. Manage labor distribution
	8. Record time and attendance
	9. Issue paychecks
	10. Produce payroll reports
Student Services	1. Recruit students
	2. Manage recruiting events
	3. Evaluate applications
	4. Admit students
	5. Administer tuition and fees

(Continued)

Table 3-1. Business Areas and Processes (cont.)

Category	Process
Student Services (cont.)	6. Produce student bills
	7. Process payments
	8. Manage receivables
	9. Process aid applications
	10. Determine need
	11. Perform verification
	12. Package loans
	13. Produce reports to lenders, agencies, and auditors
	14. Maintain course catalog and schedule
	15. Plan academic careers/advising
	16. Process student course enrollments
	17. Audit degree completion
	18. Maintain grades
	19. Verify enrollment status
	20. Issue transcripts
Grants Management	1. Prepare grant proposals
	2. Obtain and track proposal approvals
	3. Track grant budgets
	4. Report time and effort
	5. Provide grant reports to agencies
Management Information and Analysis	1. Analyze sources and uses of funds
	2. Analyze workforce
	3. Enrollment management
	4. Research management

Process Framework

The business processes selected differ significantly in their purpose and ownership. They also differ in degree of difficulty for improvement and payback for improvement to the institution. As a consequence, we would not expect an institution to try to achieve excellence in all of these processes. For example, some are shaped significantly by external agencies with formats that must be complied with, eschewing any creativity by the institution. For other processes, the potential benefits of high performance may not be worth the cost of improvement.

In recognition of these differences we created a framework to help us differentiate among the processes selected and suggest plausible outcomes. The logic of this model is drawn from the fact that colleges and universities are political organizations often with high managerial ambiguity, unclear goals, and complex decision-making processes that best resemble stakeholder politics (Cohen and March, 1974). The framework employs two dimensions. The first dimension, or continuum, is breadth of political engagement—from low or narrow

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political concern to high or broad political concern. For example, some processes are very relevant to a small or focused portion of the institution, while other processes affect virtually everyone. The second dimension pertains to the strategic impact of the process. At one end of the spectrum are processes that have a low strategic impact. These processes depend, to a large extent, on local "championship"; unless someone takes a stand for these processes, they are likely to draw little attention. At the other end of the spectrum are processes with a high strategic impact. Often, there is high resistance to change these processes, and doing so is often perceived as an opportunity to "bet your career" on a high payoff. These high payoff processes offer an institution a potential for strategic differentiation among competitors if they can achieve high levels of process performance. Advising students is one process that offers the potential for strategic differentiation.

Together these two axes produce the two-by-two matrix presented below (see Figure 3–1). We used the matrix to formulate our hypotheses regarding the process performance we would expect to see in each quadrant of the matrix.

The authors surmised that process performance would prosper chiefly under two conditions:

◆ Where processes are of *narrow* political concern (low breadth of political engagement) and where the *impact of processes is high*. This category consists of "low political engagement, high gain." Change to processes like these is relatively easy to make. Just do it! (Quadrant 3)

◆ Processes that are of *widespread concern* (high breadth of political engagement) are inherently risky to change, and the impact of processes is high. The model predicts that such processes would also receive high performance ratings. We predict larger variances in performance in processes of this type, as efforts to enhance these processes are often "bet your career" kinds of opportunities. (Quadrant 4)

Two other conditions make it less likely to find high process performance:

◆ Change to processes that are of *focused concern* (low breadth of political engagement) and of *low strategic impact* depends to a great extent on local "championship." The unspoken words here are: "unless someone makes a stand here, there are likely to be bigger fish to fry." In other
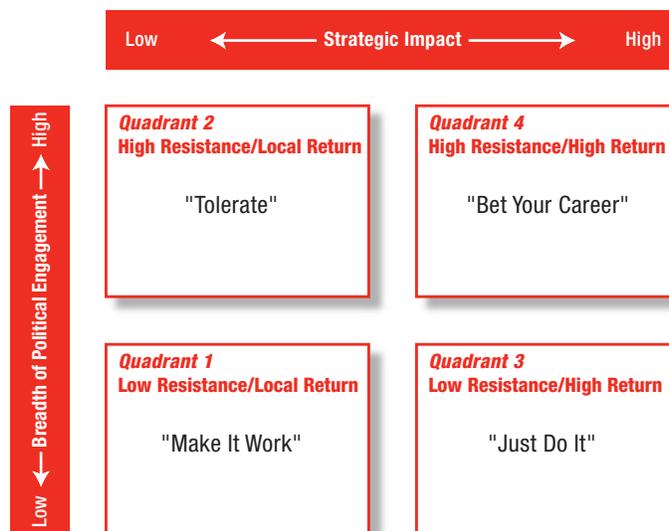
Figure 3-1. Business Process Taxonomy

words, in the absence of strong leadership, the owners of institutional processes like these are predicted to make things work as they are. (Quadrant 1)

Processes with a *low strategic impact* that nevertheless engaged the *broad attention* of the academy are rarely perceived to be worth the effort. These are processes whose adequate performance can be tolerated and for which reform "could await another day." (Quadrant 2)

Applying the Framework

We sorted the selected business processes into the appropriate quadrant based on our assumptions regarding their strategic impact and ownership. The quadrants have the following characteristics:

- Quadrant 1—low resistance/local return: "make it work"
- Quadrant 2—high resistance/local return: "tolerate"
- Quadrant 3—low resistance/high return: "just do it"
- Quadrant 4—high resistance/high return: "bet your career"

The remainder of this section presents our baseline categorization of the processes in the study.

Finance

The majority of the finance processes map to Quadrant 1. This reflects the heavy regulatory influence on finance processes and the traditional central authority of the chief financial officer over these processes. Quadrant 1 finance processes include:

- Create accounts
- Prepare external financial statements
- Pay invoices
- Fulfill check requests
- Receive cash

Quadrant 4 contained the second most processes with two. They include:

- Develop budgets

- Track budgets and expenditures

We placed the last two budget processes in this quadrant because their strategic impact is significant. There are typically numerous shadow systems that support these processes leading to conflicts over budget allocations and reconciliation. And typically far more stakeholders including deans, department chairs, college administrators, and multiple central offices believe they share ownership of these processes.

"Purchase small-dollar items" is placed in Quadrant 2. It is a commodity process with broad political engagement. Finally, "purchase large-dollar items" is placed in Quadrant 3. Because significant institutional resources are expended through this process, it has a greater strategic impact. It tends to be more centrally controlled, especially in public institutions.

Human Resources

Like finance, the majority of the HR processes map to Quadrant 1. These processes are heavily influenced by legal and regulatory requirements and are traditionally controlled by central administration. The Quadrant 1 HR processes include:

- Administer benefits
- Manage labor distribution
- Record time and attendance
- Issue paychecks
- Produce payroll reports

We mapped four processes into Quadrant 2:

- Recruit employees
- Manage compensation
- Hire staff
- Manage positions

These processes are typically diffusely controlled in an institution. Many departments craft local hiring practices and criteria, which may vary significantly. The overall process tends to be a commodity process, but for reasons stated, our hypothesis is that they are more difficult to change.

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Finally, we mapped the "hire faculty" process into Quadrant 2. We discounted its strategic impact because the aspect of faculty hiring we included in the study related primarily to the administrative steps to hire rather than to the recruitment and selection of new faculty.

Student Services

Many of the student processes also mapped to Quadrant 1. These include:

- Evaluate applications
- Admit students
- Produce student bills
- Process payments
- Manage receivables
- Process aid applications
- Determine financial need
- Verify aid application
- Package loans
- Produce reports to lenders and agencies
- Maintain grades

Typically such processes are controlled centrally and are more commodity-like. Some, such as the financial aid processes, are regulated by external agencies.

The student area also contains several processes with much broader stakeholder influence on process design and execution. These are Quadrant 2 processes, which include:

- Administer tuition and fees
- Maintain course catalog and schedule
- Process student course enrollments

Quadrant 3 contains two processes that can have a greater strategic impact for the institution, but are controlled by relatively few stakeholders. These include:

- Recruit students
- Manage recruiting events

Likewise, in Quadrant 4 are two additional processes with greater strategic impact, but with broader political engagement. They include:

- Advising process
- Audit degree completion

Grants Management

We placed the process "prepare grant proposals" in Quadrant 2. The preparation of grants must often comply with explicit rules and timelines and conform to agency-determined criteria. At the same time, different funding agencies, both internal and external, create their own processes, rules, and criteria making it difficult to establish a more uniform and easy to use process.

The "track grant budgets" process is mapped to Quadrant 4, although it should evolve and ultimately be placed in Quadrant 3. It has many stakeholders. It is a process that has been addressed both locally and centrally. When a sound central solution is found, the ability to know what the grant holder has to spend and where funds can be reassigned can have a significant impact on grant outcomes. It also enables the institution to better track overall expenditures to lower risk, improve accountability, and to assess the overall impact and magnitude of grant activity for the institution.

"Reporting time and effort" is a highly distributed process with a broad spectrum of stakeholders. It can be difficult to change despite the fact that it is heavily influenced by external regulations. Therefore, we place it in Quadrant 2, but it should evolve to Quadrant 1.

Finally, the processes "provide grant reports to external agencies" and "obtain proposal approvals" are normally centrally controlled, mandated, and prescribed process. Therefore, we place them in Quadrant 1.

Research Team

Robert B. Kvavik and Philip J. Goldstein are the principal investigators for this study. John Voloudakis crafted Chapter 8 on the future of business process performance and, with Richard N. Katz, was instrumental in the development of the survey instrument. Julie A. Ouska and Judith A. Pirani made

significant contributions to the study through qualitative interviews and a review of the literature. Mark Nelson also contributed to the literature review.

Robert B. Kvavik earned his PhD from Stanford University (1971). He is currently professor of political science and associate vice president at the University of Minnesota. He directed the University of Minnesota's implementation of PeopleSoft Student and Human Resources modules. He has published extensively in his academic discipline and increasingly on the impact and organization of information technologies on institutional services. Kvavik is a nationally known speaker on e-business and IT-enabled services in higher education. He is a principal author of ECAR studies on ERP, IT security, IT leadership, and student use of technology. Kvavik was appointed a senior fellow of ECAR in January 2002.

Philip J. Goldstein earned his MBA from New York University (1995). He is currently an independent higher education consultant and ECAR research fellow. Goldstein spent 16 years consulting to higher education on administrative process improvement and the adoption of new technology. He was a partner at PricewaterhouseCoopers, where his responsibilities included the firm's ERP practices for higher education. Goldstein was also an administrator at the University of Pennsylvania for two years before being appointed an ECAR fellow in September of 2003. In 2004, he authored ECAR's study of IT funding.

John Voloudakis earned his MBA from Boston University (1996) and completed his undergraduate studies at Tufts University. He is currently a regional practice leader in management consulting firm BearingPoint's higher education industry practice and is an ECAR research fellow emeritus. Voloudakis has spent nearly 15 years working with and managing information systems organizations in higher education and healthcare, including five years as an IT manager at Harvard University. He has been

a coauthor of or major contributor to a number of ECAR research studies, including studies on ERP, IT security, IT alignment, and networking.

Richard N. Katz earned his MBA from UCLA (1989) and was ABD (History) at the University of California, Berkeley. Katz is vice president of EDUCAUSE and founding director of ECAR. Prior to joining EDUCAUSE in 1996, Katz spent 14 years in a variety of executive and management positions at the University of California. His work at UC earned him numerous awards, including university-wide recognition for leadership and innovation in 1995, the second such prize awarded. Katz has authored or edited six books and more than 50 monographs, research studies, and articles. He is a coauthor of ECAR studies on ERP, IT leadership, and IT alignment.

Julie A. Ouska earned her MS in organization leadership from Mercy College (2005) and a BA in fine arts and a BS in business MIS from the University of Northern Colorado. Most recently she was vice president for administrative services and CIO for Mercy College in Dobbs Ferry, New York. Her portfolio included information technology, telecommunications, facilities, safety, and general and auxiliary services. Previously, Ouska was an account executive for SunGardSCT managing higher education and government outsourcing contracts. In April 2005, Ouska became a regional manager for SunGard Collegis. She also teaches in Mercy College's online masters program for organizational leadership.

Judith A. Pirani earned her MBA from Hofstra University (1984) and her BA from Simmons College. She is an ECAR research fellow and president of Sheep Pond Associates. Her expertise is in the area of educational technology. Pirani has coauthored three ECAR studies: *Wireless Networking in Higher Education, Supporting E-Learning in Higher Education*, and *Information Technology Networking in Higher Education: Campus Commodity and Competitive Differentiator*. Previously

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she was vice president at Lyra Research and Giga Information Group, where she managed worldwide research practices in digital imaging technologies.

Mark R. Nelson earned his BS from Saint Michael's College (1991), his MBA (1998) and PhD (2000) from the University at Albany, State University of New York (SUNY). He is the digital content strategist for the National Association of College Stores (NACS). In this capacity, Nelson assists in developing and implementing initiatives and business models to support or enhance the role of college stores in the distribution of digital content. Prior to joining NACS in March 2005, Nelson was an assistant professor in MIS and IT management at Rensselaer Polytechnic Institute. Nelson was an ECAR fellow in 2003 and 2004. Nelson devotes his research to topics relating to strategic alignment of IT, cross-functional integration, large-scale systems implementation, and CIO leadership. He has authored several ECAR research bulletins and coauthored ECAR studies on IT alignment and IT leadership.

Methodology

The study builds upon quantitative and qualitative data from 335 institutions of higher education.

Quantitative Data

A quantitative Web-based survey was designed by ECAR with special assistance from John Voloudakis. EDUCAUSE staff sent an e-mail invitation with the Web address of the survey and access code information to 1,473 institutions belonging to EDUCAUSE. Senior college and university administrator—the majority were CIOs at 335 institutions—responded to the survey. Their responses provide a detailed understanding of how higher education is engaged with business process improvement and innovation. The survey's questions are found on the ECAR Web site <http://www.educause.edu/SurveyInstruments/1004>. Appendix A identifies the institutions that responded to the survey. Note that the survey information collected is confidential. No data from the quantitative survey are presented that would make it possible to identify a particular institution or respondent and the data files we use for analysis have been purged of any data that would have similar consequences.

We use means and standard deviations in this study. Means are arithmetic averages and measures of central tendency. Standard deviations are measures of dispersion or variability. What this means is that the larger the standard deviation, the more disagreement exists among the respondents. We also did some comparison of means and regression analyses to determine levels of correlation among the variables. We refer to these analyses but do not present the figures for reasons of simplicity. Note also that percentages in some of the tables do not add up to 100 percent because of rounding.

We urge caution in interpreting these data because of the small number of institutions that reported being leaders or exemplars of business process improvement.

Qualitative Data

We collected qualitative data by means of interviews with IT leaders who were significantly engaged with business process performance at their institutions. Judith A. Pirani and Julie A. Ouska conducted a series of interviews with 32 senior administrators and IT leaders at 29 institutions that exhibited different characteristics based upon their survey responses. The institutions chosen

◆ rated themselves as a leader or exemplar of business process performance improvement in general, or specifically for grant, student recruitment, and/or degree audit business processes;

- were undergoing significant change by addressing and modifying a large number of business processes simultaneously;
- indicated that several of their business processes were performing unsatisfactorily; and/or
- used employee suggestions to improve business processes.

The individuals and institutions are identified in Appendix B.

Our purpose was to uncover in greater depth what distinguished institutions that considered themselves exemplars from those that had business processes deemed at risk. One factor that distinguishes exemplar institutions is the importance of employee suggestions and we wanted additional evidence to support findings from our quantitative data. We wanted a sharper explanation of what was causing change. And lastly, we wanted a better understanding of how institutions managed to improve strategic business processes, which we hypothesize are most difficult to change.

Carnegie Class as a Distinguishing Factor

The study grouped the sample by a modified Carnegie classification of institutions of higher education, <http://www.carnegiefoundation.org/Classification/CIHE2000/defNotes/Definitions.htm>.

The Carnegie taxonomy describes the institutional diversity in U.S. higher education. Most higher education projects rely on the classification to ensure a representative selection of participating individuals and institutions. The study collapsed the categories as follows to obtain larger numbers for statistical and descriptive purposes:

- Doctoral/research universities (extensive, or Dr. Ext.) and doctoral/research universities (intensive, or Dr. Int.). Dr. Ext. research universities typically offer a wide range of baccalaureate programs and graduate

education through the doctorate. They award 50 or more doctoral degrees per year in at least 15 disciplines. Dr. Int. typically offer a wide range of baccalaureate programs and graduate education through the doctorate. They award at least 10 doctoral degrees per year in three or more disciplines, or at least 20 doctoral degrees per year overall.
- Master's colleges and universities (MA) typically offer a wide range of baccalaureate programs and graduate education through the master's degree. The study grouped both master's colleges and universities I and master II together.
- Baccalaureate colleges (BA) are primarily undergraduate colleges with major emphasis on baccalaureate programs. The study grouped the three baccalaureate college groups (Baccalaureate Colleges—Liberal Arts, Baccalaureate Colleges—General, and Baccalaureate/Associate's Colleges) into a single BA group.

Associate's colleges (AA) offer associate's degree and certificate programs but, with few exceptions, award no baccalaureate degrees.

We elaborate on differences between public and private institutions. Forty percent of the institutions in our study are private; 60 percent are public. We found little difference, however, along this dimension.

Institutions Surveyed and Their Characteristics

Figure 3-2 compares the distribution of the institutions that responded by their new Carnegie class, EDUCAUSE membership, and the universe of higher education institutions in the United States. The responding schools much more closely mirror the EDUCAUSE membership than they do the national population of institutions by Carnegie class.

Note also that the study relied on volunteers to complete the survey rather than on a

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random sample, and this limits the statistical conclusions that are possible.

A statistical analysis of the data's representation of Carnegie class and EDUCAUSE membership proved inconclusive. The findings do not support the conclusion that the institutions surveyed represent the population as a whole. Nor do they support the opposite conclusion that the respondents fail to represent the

EDUCAUSE membership. Neither conclusion is statistically significant.

The survey is weighted toward smaller schools. Almost two-thirds (63.5 percent) are from institutions with student enrollments of 8,000 or fewer (see Figure 3-3).

The vast majority (70.4 percent) of our respondents were CIOs and 90.0 percent worked within their institution's IT organization (see Figure 3-4).
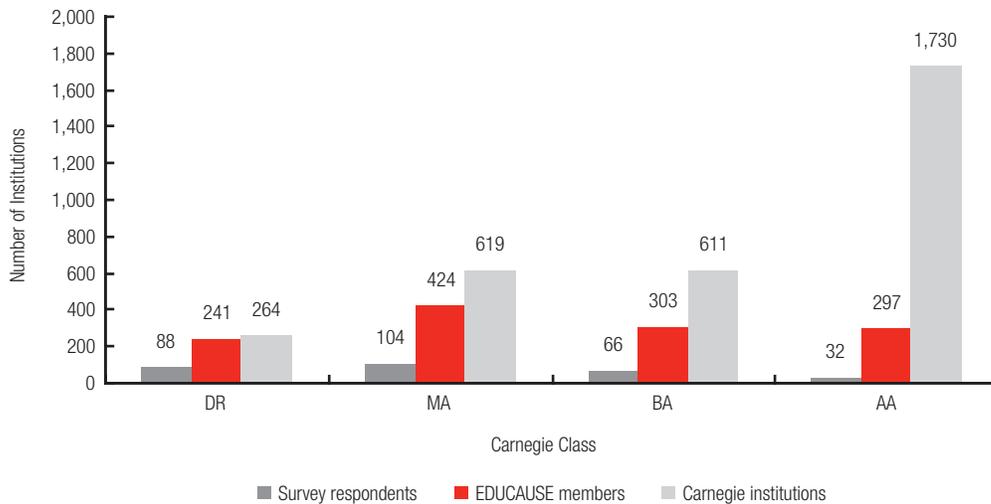
Figure 3-2. Survey Respondents by EDUCAUSE Membership and Carnegie Class
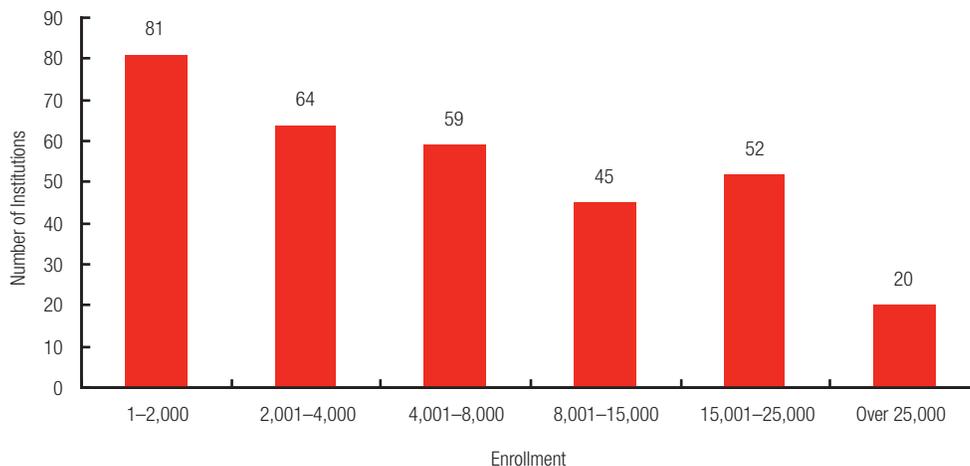
Figure 3-3. Student Enrollments at Institutions Studied

The respondents, as a whole, have extensive experience (see Table 3-2). The group had on average 12.3 years of experience (mean of 12.34). The median years of experience is 9.0 and the mode was over 25 years. We found no difference in these percentages among private and public institutions. To a very small degree, AA institutions had fewer individuals with 10 years or more experience, but the small sample size leads us to caution against generalizing from our data.

Regardless of years at the institution, all of our respondents report being involved with business process performance improvement (see Figure 3-5). On a five-point scale ranging from (1) strongly disagree to (5) strongly agree, the mean level of involvement was 3.93. Fully 79 percent agreed or strongly agreed that they were involved with business process improvement. This is not surprising, as historically business process performance improvement has been a core feature and expectation of IT organizations.

Figure 3-4. Survey Respondents' Occupational Titles
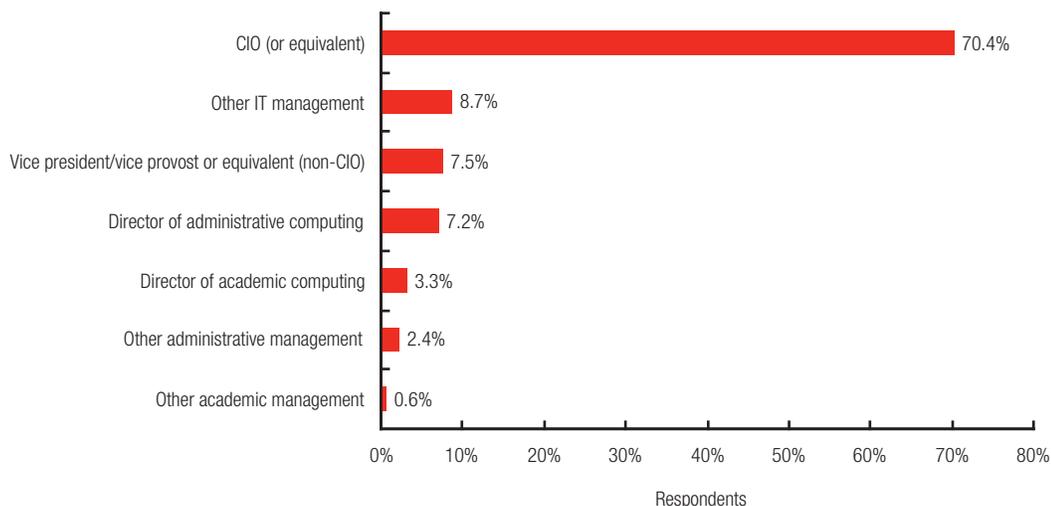
Table 3-2. Respondents' Years of IT Experience at Current Institution

Years	Frequency	Percent
0–5	88	26.3%
6–10	100	29.9%
11–15	33	9.9%
16–20	35	10.5%
Over 21	78	23.4%
Total	334	100.0%

Our respondents bring a great deal of experience to our study and provide a broad view of IT business process performance improvement from a variety of IT positions and institutions within higher education. We are gratified by the number of respondents, which makes the findings more than simply the observations of a small subset of the industry. In the chapters that follow, we present their collective view of IT business process performance improvement in higher education.

Strongly Disagree, 25, 7%

Disagree, 16, 5%

Neutral, 31, 9%

Strongly Agree, 115, 34%

Agree, 147, 45%
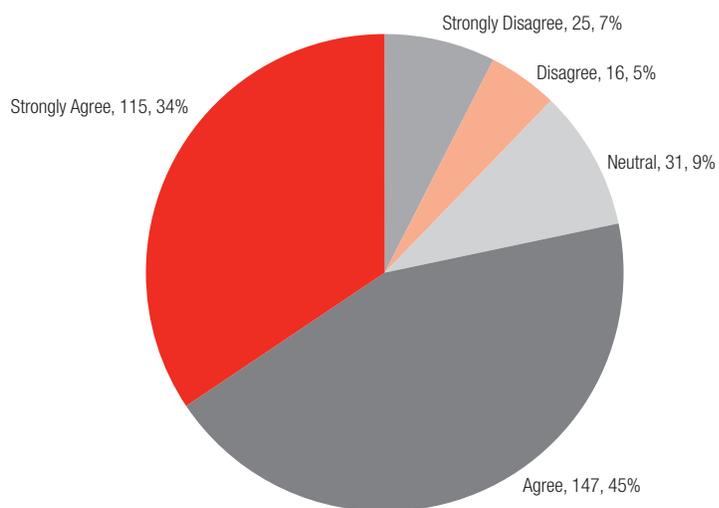
Figure 3-5. Respondents' Involvement with Business Process Performance

4

The State of Business Process Performance

You can't build a reputation on what you are going to do.

—Henry Ford

How do respondents assess the current state of business process performance at their institution in the areas of finance, human relations, student, grants management, and management information and analysis We illustrate the state of the industry's practice with performance maps that show perceived levels of business process performance for 48 processes in five business areas at 335 universities and colleges. Is there any apparent pattern of business process improvement in and across the five functional areas—finance, HR, student, grants management, and management information and analysis? (See Figures 4-1, 4-4, 4-7, 4-10, and 4-12.) To what degree do we find common levels of performance in the four quadrants discussed in Chapter 3? Are some business areas doing better than others? In a later chapter, we will try to explain probable sources of divergence.

One would expect, other things being equal, all institutions to be comparably capable of improving many business processes, especially those that are tightly controlled and/or standardized either through software or common regulation. New and supporting technologies such as ERP, business intelligence tools, and the Web are readily available. Training in improvement methodologies is plenti-

Key Findings

- ◆ Respondents have achieved higher levels of performance with their transactional processes than with monitoring or managerial processes.
- ◆ Respondents reported the highest level of performance for student processes and the lowest for grants management and management information.
- ◆ Three grants management processes were reported at risk by at least 20 percent of respondents.
- ◆ Nine student processes were reported as leading processes by at least 10 percent of respondents.
- ◆ Institutions have sought to be leaders (optimize rather than satisfice) most frequently in the student services area, and especially in processes that affect recruitment and retention.
- ◆ Respondents are most satisfied with reporting for enrollment management and least satisfied with reporting to support management of the workforce.

ful. But as our data will show, the results have varied significantly, within institutions and among similar institutions. Some institutions report significant improvements and ascribe great benefits to their investments. Others have seen smaller gains or even negative impacts despite their best efforts.

Financial Processes

Our a priori expectation was that institutions could easily achieve significant satisfaction with the performance of their financial processes. Reasons for this hypothesis include:

◆ The comparability of processes across institutions should make it easy to identify and adopt best practices.

◆ Commodity processes should encounter a lower resistance to change by the user community.

◆ Strong external regulatory pressures often dictate how processes must be designed.

◆ There is relatively greater centralized control of these processes, typically by the institution's chief financial officer.

We identified nine financial processes for evaluation. The financial processes are mostly back-office transaction functions. Some, such as creating accounts or preparing financial statements, can be thought of as commodity processes. This is because the regulatory environment often prescribes how these functions must work. The financial process set also

includes purchasing items and paying invoices and check requests. These are high-volume processes that are used by virtually all faculty and staff. While not quite commodities, they are processes that are highly replicable across institutions and in some cases across industries. Finally, the category includes processes related to developing budgets and tracking budgets. These are processes that are more strategic to the institution, have a more diverse ownership, and are potentially harder to change.

What We Found

Institutions were asked to assess the level of business process performance achieved for nine financial processes (see Figure 4-1). The choices were: 1) We are at risk. 2) We are adequate. Our process works for now but needs to be changed. 3) We are satisfied. Our process works adequately. 4) We are leaders. 5) We are exemplars. What we found was that about half of the institutions were satisfied or better, and half were in the process or recognized a need to change.

Figure 4-1. Status of Financial Processes

Process	At risk	Adequate	Satisfied	Leaders	Exemplars
Cash receipts (N=278)	4.3%	46.0%	45.3%	4.3%	0.0%
Fulfill check requests (N=273)	1.5%	45.1%	49.5%	3.3%	0.7%
Pay invoices (N=290)	6.2%	39.7%	49.7%	4.1%	0.3%
Purchase large-dollar items (N=306)	7.8%	44.1%	43.1%	4.6%	0.3%
Purchase small-dollar items (N=304)	8.6%	35.2%	41.8%	12.8%	1.6%
Prepare external financial statements and reports (N=274)	6.6%	40.5%	43.1%	8.8%	1.1%
Track budgets and expenditures (N=292)	11.3%	45.2%	31.8%	10.3%	1.4%
Create accounts (N=288)	3.5%	42.0%	49.0%	5.6%	0.0%
Develop budgets (N=289)	9.7%	61.6%	20.8%	6.6%	1.4%

Institutions

■ At risk ■ Adequate ▪ Satisfied ▪ Leaders ■ Exemplars

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Table 4-1 shows the mean level of business process performance for nine financial processes based on a five-point scale: 1) We are at risk. 2) We are adequate. Our process works for now but needs to be changed. 3) We are satisfied. Our process works adequately. 4) We are leaders. 5) We are exemplars. The processes are rank ordered using the mean to show the average level of business process performance reported for each process.

On the whole, institutions ranked themselves between adequate and satisfied. The differences were small, ranging from a mean of 2.64 to 2.28 with fairly consistent standard deviations for each process. The one exception was developing budgets with a mean of 2.28. This result seems to support our hypothesis that the more strategic process of developing budgets would be relatively harder to change. Purchase small-dollar items scored highest, with a mean of 2.64.

When we map these processes into the quadrants introduced in Chapter 3, not surprisingly the strategic processes placed in Quadrant 4 (high resistance/high return) have the lowest means and the highest standard deviations, confirming our hypothesis that

these are the hardest to do and that institutional process performance varies more significantly as a consequence (see Figure 4-2). Conversely, commodity processes show the highest levels of performance and the lowest standard deviations. It is likely that many of these processes have been standardized and codified in the financial information system.

Somewhat surprising is small-dollar purchases, which has the highest mean but a very high standard deviation suggesting some internal resistance. We had expected it to fall in Quadrant 1 (low resistance/local return) or Quadrant 3 (low resistance/high return). The high return is a result of improving high volumes of transactions, which are made more convenient. It may be that many institutions run into resistance changing the small-dollar order process because it involves replacing a decentralized legacy process with fewer controls with a structured process. It may be that this process has the highest mean simply because there are some very well known and proven improvement options.

To further demonstrate the difficulty of the develop budget process for higher education, we grouped the responses into

Table 4-1. Performance of Financial Processes

What level of performance has your institution achieved?	Mean	Std. Deviation
Purchase small-dollar items	2.64	0.872
Prepare external financial statements and reports	2.57	0.787
Fulfill check requests	2.57	0.621
Create accounts	2.57	0.654
Pay invoices	2.53	0.692
Cash receipts	2.50	0.651
Purchase large-dollar items	2.45	0.719
Track budgets and expenditures	2.45	0.874
Develop budgets	2.28	0.783

| Low | ← Strategic Impact → | High |
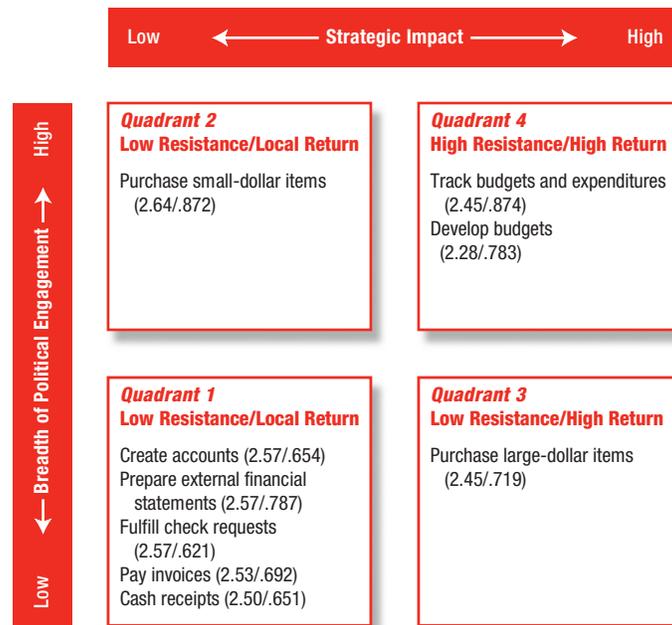
**Figure 4-2.
Financial Processes**

Breadth of Political Engagement →

High

Quadrant 2
Low Resistance/Local Return

Purchase small-dollar items
(2.64/.872)

Quadrant 4
High Resistance/High Return

Track budgets and expenditures
(2.45/.874)
Develop budgets
(2.28/.783)

Quadrant 1
Low Resistance/Local Return

Create accounts (2.57/.654)
Prepare external financial
statements (2.57/.787)
Fulfill check requests
(2.57/.621)
Pay invoices (2.53/.692)
Cash receipts (2.50/.651)

Quadrant 3
Low Resistance/High Return

Purchase large-dollar items
(2.45/.719)

Low

The figures in the quadrants are (mean/std. deviation)

two sets: 1) less satisfied, which included institutions that indicated that a process was at risk or was adequate for now, and 2) satisfied, which included institutions that indicated they were satisfied, leaders, or exemplars (see Figure 4-3). The develop budget process stands out with only 28.7 percent of the institutions being satisfied as compared to purchase small-dollar items in which 56.3 percent were satisfied.

There are several possible explanations for the relatively lower score achieved by the develop budget process. First, the process has many stakeholders and is therefore harder to change. Second, it is difficult to separate process from policy or budget philosophy. It could be that respondents were expressing dissatisfaction more with their institution's resource allocation methods than with the mechanical steps used to develop a budget. Third, it could be that many institutions have not yet invested as much in technology that supports the develop budget process as they have for other financial areas. Fourth, it is also known that the budget module of ERP

packages is often not included in the first wave of implementation. As a result, people attempting to improve budget processes are often doing so with legacy and/or third-party tools, resulting in nonstandard outcomes and hence, high standard deviations.

Overall, what we see across all financial processes is less satisfaction with management activities (developing budgets), more satisfaction with monitoring activities (tracking budgets), and even more satisfaction with transaction processing. The first deals with a non-IT management process, the second with business intelligence/analytics, and the third with the transaction processing system—legacy system or ERP.

This finding mirrors the way many institutions pursued administrative improvement. The initial focus was on reengineering financial transaction processing either before or in conjunction with an ERP implementation. Some ended their improvement processes there, while others continued to pursue additional improvement in reporting and management activities. In some notable and exceptional
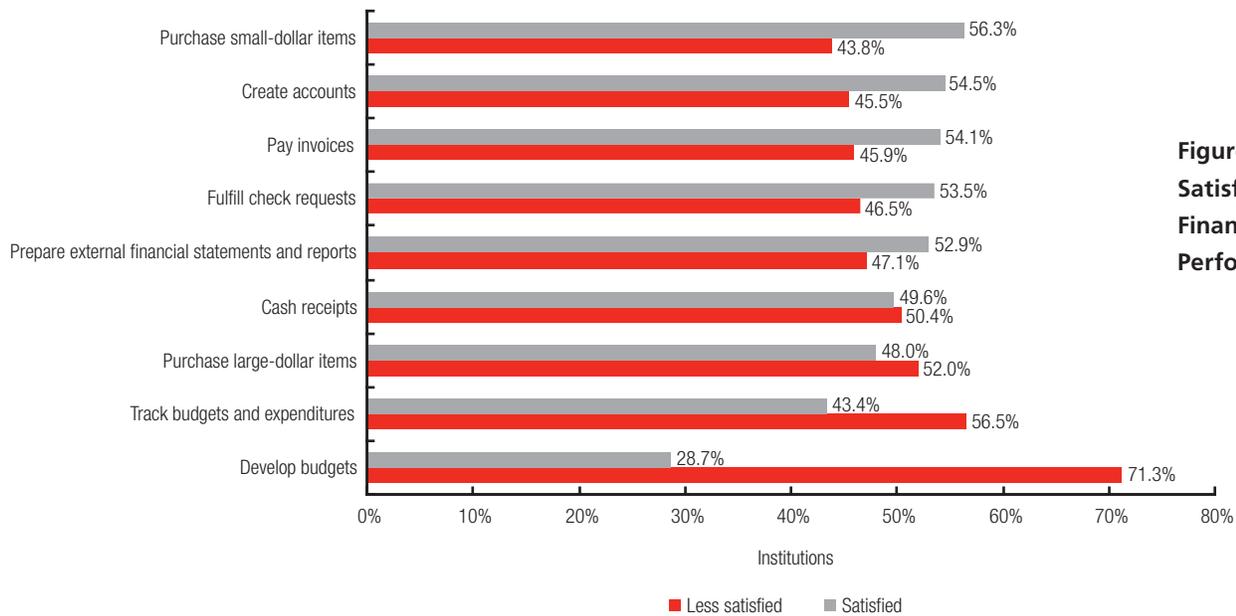
**Figure 4-3.
Satisfaction with
Financial Process
Performance**

cases, institutions like The University of Texas at Austin; the University of California, San Diego; Indiana University; the University of California, Irvine; and the University of Washington opted to place their priorities on reporting and analytics prior to renewing the underlying financial information system.

Florida Atlantic University (FAU) is an example of an institution that drove its financial process improvement efforts with an ERP implementation. Jeffrey Schilit, associate provost and CIO, notes that FAU was one of the first institutions in the state to implement an ERP. "We were the first state institution in Florida to do our own payroll. The ERP system and process changes have given us better control over our finances. Now FAU can track its expenditures, cut its own paychecks, and process its own travel reimbursements without going to the state. We also process purchase orders online. We have been able to streamline a lot of the activities and have improved our efficiency and effectiveness."

This approach was most likely driven by a pragmatic need to improve the efficiency of high-volume financial transaction processing

used by many at the institution. In fact, the buy-pay (purchasing) process was one of the first to be reengineered, especially the process for purchasing low-cost goods. It may also reflect a practical decision to push for improvement first in areas of least resistance.

The University of Delaware and Coppin State University are examples of two institutions that have made improvements to the procurement process. Susan Foster, vice president information technologies at the University of Delaware, describes how the university uses procurement cards that are integrated with their reconciliation process and Delaware's financial system. "Faculty and staff members use their purchase cards to buy goods and services from vendors and the UD Mart, the University of Delaware's online market. Low prices and convenient processing are the major incentives for use. There is no paper associated with the process. Departments no longer have to process journal vouchers or checks requests with their orders. The bank that issues the cards provides the university a rebate on purchases, which is sizable and has helped finance the university's ERP initia-

tives. The procurement department works much more efficiently and effectively where they have reduced staff through attrition. It has been a remarkable way to provide good service, create new revenue, and reduce the workload of the back-office."

Ahmed El-Haggan, vice president of IT, CIO, and professor of computer science, Coppin State University, describes how his institution used policy changes in conjunction with new technology to improve the requisition process. "Requisition processing is now done electronically. It used to require four or five signatures to approve a requisition. With the automated controls and workflow of the system, there is no need for a budget officer to review requisitions. No human intervention is required. Requisitions now can be processed in five minutes instead of five days."

Not surprisingly, the process with the highest level of satisfaction is also the process in which more institutions report themselves as leaders or exemplars—purchase small-dollar items (13.9 percent as shown in Table 4-2). The lowest reported process with leaders or exemplars was fulfill check requests at 3.9 percent. Note, however, if we compare ratings in Figure 4-3 and Table 4-3, we see that several processes that score lower in satisfaction seem to be those processes that have been

undergoing most change: develop budgets, and track budgets and expenditures.

Note that no institution reported itself as an exemplar in the create accounts and cash receipts processes although several institutions listed themselves as leaders see Figure 4-1) Less than 1.0 percent of the institutions considered themselves exemplars for the nine financial processes. Quite possibly, institutions may not consider it beneficial to become exemplars in this area. It stands to reason that the goal of institutions would be to have a process for creating accounts that is reliable and efficient. There may be relatively little institutional gain or opportunity to pursue something innovative in this area. A similar circumstance may be true for the cash receipts process. Financial accounting and reporting need to be timely and accurate, and must comply with policy and law. Performance of processes beyond those levels is the domain of financial services firms and industries.

The processes currently undergoing the most modification are shown in Table 4-3. Institutions reported that 9.4 percent had recently changed the develop budgets process and 7.9 percent had changed track budgets and expenditures.

It should be no surprise that the two processes undergoing change most frequently are

Table 4-2. Institutional Leaders by Financial Process*

Financial Process	Leaders
Purchase small-dollar items	13.9%
Track budgets and expenditures	10.8%
Prepare external financial statements and reports	9.2%
Develop budgets	7.3%
Create accounts	5.2%
Purchase large-dollar items	4.7%
Pay invoices	4.3%
Cash receipts	4.2%
Fulfill check requests	3.9%

Leaders include institutions that rated themselves as leaders or exemplars

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those reported to be at greatest risk at higher education institutions (see Table 4-4).

Interpreting the Findings

The institutions most satisfied with their purchasing processes are least satisfied with their budget development and monitoring capacity. As previously mentioned, the buy-pay (purchasing) process is where many institutions started their reengineering. Many began with small-dollar purchases because the need for improvement was high. Institutions encountered relatively less resistance to change in this area than they would in a managerial process such as develop budgets. Further, many improvements have been possible in procurement with projects that were relatively fast and cheap. Procurement credit card programs, direct ordering with vendors, and limited use of e-commerce all enable institutions to streamline small-dollar purchases with targeted technologies.

Institutions appear to have either deferred or had more difficulty improving the budget process. This may be attributable to a combination of factors. For some institutions, the budget is as much a political as a business process. As such, it is difficult to change without significant time and leadership to overcome stakeholder resistance. Institutions that pursue sophisticated budget management philosophies such as responsibility center management would likely fall into this category. Others may have postponed an

Table 4-3. Financial Processes Undergoing Most Change

Financial Process	Changed
Develop budgets	9.4%
Track budgets and expenditures	7.9%
Prepare external financial statements and reports	6.5%
Create accounts	5.9%
Purchase small-dollar items	4.1%
Purchase large-dollar items	3.2%
Pay invoices	4.0%
Fulfill check requests	4.2%
Cash receipts	3.5%

Table 4-4. Financial Processes at Risk

Financial Process	At Risk
Track budgets and expenditures	10.4%
Develop budgets	8.8%
Purchase small-dollar items	8.2%
Purchase large-dollar items	7.6%
Prepare external financial statements and reports	6.1%
Pay invoices	6.0%
Cash receipts	4.2%
Create accounts	3.3%
Fulfill check requests	1.4%

improvement because it was not a priority at their institution. Many institutions have straightforward annual budget processes that distribute across-the-board increases or decreases. Finally, for some, technology may not be considered sufficient to facilitate improvement. These institutions may have felt that neither the budget modules of ERP systems nor stand-alone budget systems could adequately support their needs.

The relatively larger percent of respondents planning improvements in their budget process might suggest that tougher times demand more of the systems that track and allocate funds; capabilities of the budget systems on the market have improved; or institutions may have found ways to improve these processes through a combination of technology solutions. We shall return to this subject in the next chapter.

Human Resource Processes

The human resources area is a mix of tightly controlled centralized transaction processes and loosely governed distributed processes that have a strategic impact on the institution. Centrally managed commodity processes include benefits administration, payroll disbursement, payroll reporting, and recording time and attendance. As with the finance area, these are processes that are rule driven, and they are generally controlled by the central HR or finance organization.

The category also contains processes that are highly diffused such as faculty and staff hiring. These processes are of great importance and often depend on coordination between central and local campus units. Finally, the category contains the processes of managing compensation and managing positions that, like budget development, are reflective of sets of work steps and policies.

As with student services, improvement in HR is shaped by the concept of one-stop

shopping. Steve Brown notes, "The emphasis is still on one-stop shopping—allowing employees to take care of all of their needs in one navigable location. A windfall of new data and functionality is being woven into these one-stop depots to bolster consumer decision support and education on critical life events. Today's portal design not only seeks to simplify and shorten the transactional process for employee consumers, but also to parlay Web capabilities to educating them as well." (Brown, 2004). HR in all industries is using technology and process improvement to enable employees to do more for themselves in a streamlined manner.

What We Found

Institutions were asked to assess the level of performance achieved for 10 HR processes (see Figure 4-4). The choices were: 1) We are at risk. 2) We are adequate. Our process works for now but needs to be changed. 3) We are satisfied. Our process works adequately. 4) We are leaders. 5) We are exemplars. We found a minority of respondents were satisfied or better with their HR processes.

Table 4-5 shows the mean level of business process improvement for HR based on a five-point scale: 1) We are at risk. 2) We are adequate. Our process works for now but needs to be changed. 3) We are satisfied. Our process works adequately. 4) We are leaders. 5) We are exemplars. The processes are rank ordered using the mean.

On the whole, institutions ranked themselves as adequate. The differences are small, ranging from a mean of 2.71 to 2.16 with very similar standard deviations. As we anticipated, transactional processes (payroll disbursement, payroll reports, and administer benefits) placed in Quadrant 1 were rated more highly than processes that had either more diffuse political control, or were more strategic in importance (faculty and staff hiring) or more managerial in nature (manage positions).

(See Figure 4-5.) We had expected to place recruit employees and manage compensation in Quadrant 1, but our findings suggest that these may be more distributed processes than first thought. Also, the lower mean for manage compensation suggests that some respondents interpreted the process to include compensation philosophy.

Wayne A Veres, dean, instructional and information technology services and CIO, California State University, San Marcos, reports that his campus has significantly improved its

Figure 4-4. Status of HR Processes
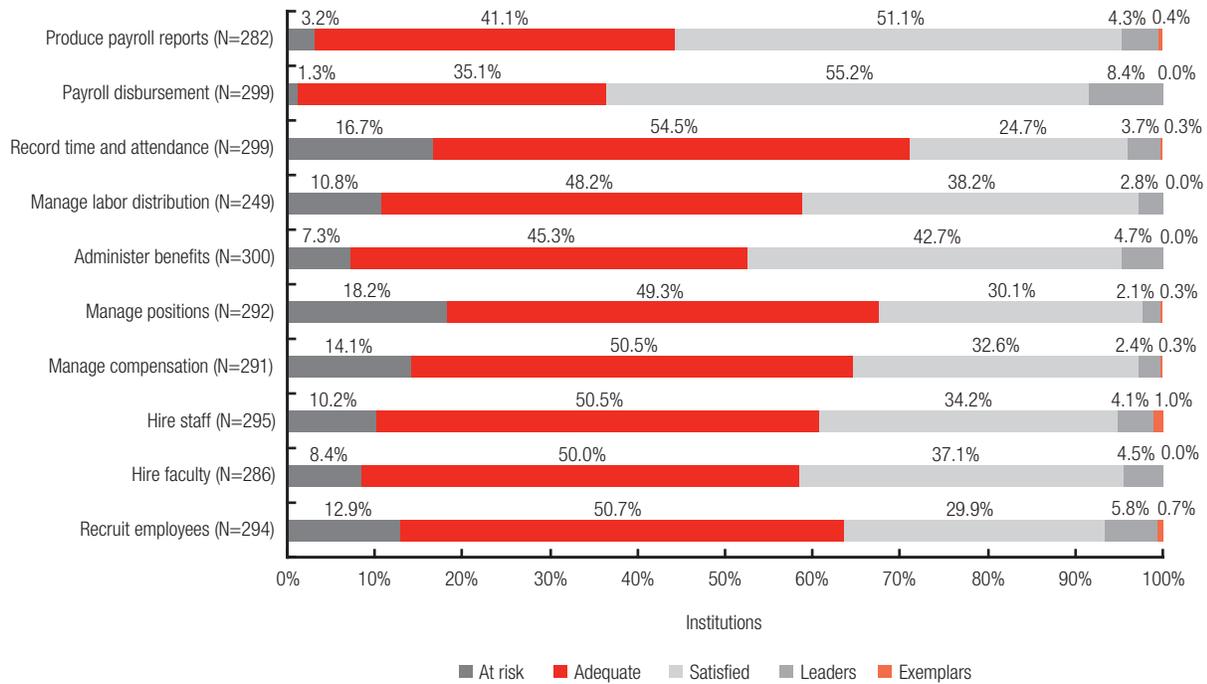
Table 4-5. Performance of HR Processes

What level of performance has your institution achieved?	Mean	Std. Deviation
Payroll disbursement	2.71	0.635
Produce payroll reports	2.57	0.645
Administer benefits	2.45	0.699
Hire faculty	2.38	0.704
Hire staff	2.35	0.759
Manage labor distribution	2.33	0.704
Recruit employees	2.31	0.793
Manage compensation	2.24	0.733
Manage positions	2.17	0.754
Record time and attendance	2.16	0.753

**Figure 4-5.
HR Processes**

	Low ⟵ Strategic Impact ⟶ High	

<table>
<tr><td rowspan="2">High ⟵ Breadth of Political Engagement ⟶ Low</td><td>**Quadrant 2**
High Resistance/Local Return

Hire staff (2.35/.759)
Recruit employees (2.31/.793)
Manage compensation
  (2.24/.733)
Manage positions (2.17/.754)
Record time and attendance
  (2.16/.753)</td><td>**Quadrant 4**
High Resistance/High Return

Hire faculty (2.38/.704)</td></tr>
<tr><td>**Quadrant 1**
Low Resistance/Local Return

Payroll disbursement
  (2.71/.635)
Produce payroll reports
  (2.57/.645)
Administer benefits (2.45/.699)
Manage labor distribution
  (2.33/.704)</td><td>**Quadrant 3**
Low Resistance/High Return</td></tr>
</table>

The figures in the quadrants are (mean/std. deviation)

hiring process. "We are the first in the CSU system to have total online recruitment/hiring for our internal and external applicants. More than 90 percent of our applicants are utilizing the electronic application process, which includes the completion of our job application and resume attachment functionality. We employ an IT HRIS project manager in the HR department whose primary responsibilities include improving business processes using state-of-the-art technology. This position reports to the director of HR and works very closely with the IT team on our campus. Both recognized a need to decrease time required to process applicants and hire a new employee through process simplification."

One surprise is that respondents' ascribed low performance to the process of recording time and attendance. This process seemingly has the attributes of a centrally controlled transaction process. Yet, it was rated as if it were a hard-to-change managerial process. The explanation may be that the process was out of the ERP scope at many institutions. Most ERP packages require an institution to buy or build a third-party application to handle electronic time capture because they do not have sophisticated time capture capability for use by hourly employees, as would a facilities management organization. These systems typically do not support time capture with swiping ID cards or automatically track eligibility for pay differentials based on labor contracts. To gain this capability, institutions need to implement a third-party time capture system that can be used with the HRIS. It may be that few institutions have yet to make this investment. Also, if an institution is heavily unionized there is significant set-up work to do to capture all the work rules in the system. Time and attendance reporting in complex organizations with medical centers and multiple collective bargaining units can also be problematic.

Coppin State is an exception. They started their improvement efforts focusing on time

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reporting. Ahmed El-Haggan reports, "We started with this HR process because we wanted an early success. Time entry is something that most employees complete as well as enter in their personal information. Managers can approve staff time; employees didn't have to ask for help. This alleviated a lot of back-office work, enabling HR and payroll departments to use their staff far more intelligently than just for data entry. It was a big hit and an important win that helped facilitate other business process redesign—such as the requisition process."

It appears that manage positions and manage compensation may have been evaluated in a similar fashion to develop budgets. Some respondents may have been expressing their dissatisfaction with their institution's compensation philosophy (e.g., pay bands or differential raises as opposed to across-the-board increases). This may have been more of a factor than shortcomings in what is a relatively straightforward process.

We then grouped the responses into two sets: 1) less satisfied, which included institutions that indicated that a process was at risk or was adequate for now, and 2) satisfied, which included institutions that indicated they were satisfied, leaders, or exemplars (see Figure 4-6). Recording time and attendance appears to be the most problematic HR process with 71.2 percent of respondents reporting being less satisfied. Payroll disbursement was perceived to perform the best with 63.5 percent of respondents being satisfied.

Few respondents see their institution as leaders in the HR area, and only payroll disbursement and recruit employees processes earned leadership scores among more than 5 percent of the respondents (see Table 4-6). No institution regarded itself as an exemplar on the payroll disbursement process (see Figure 4-4), confirming our sense that paying people on time and accurately is considered good enough.
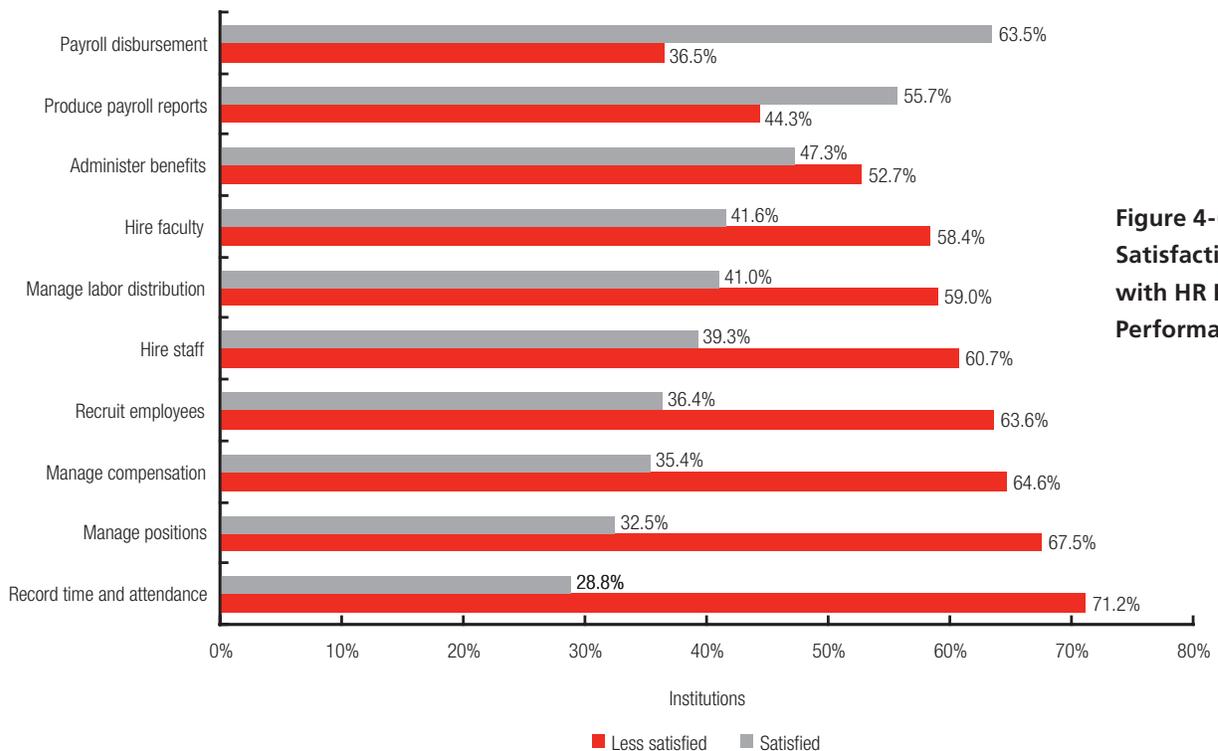
Figure 4-6. Satisfaction with HR Process Performance

It is interesting to note that few institutions rated themselves as leaders in the administer benefits category. While some institutions have invested resources (or contracted with third parties) to create Web self-service tools for employees to manage their own benefits, more institutions thought they were leaders in payroll disbursement than in benefits administration. Reasons for that could be that the adopters of self-service only considered fleetingly—until complications ensued—that this innovation made them leaders. Perhaps these institutions didn't realize they'd need to hire staff representatives to provide the benefit counseling still necessary with a self-service system. Or perhaps the Web-based, self-serve benefit enrollment and coverage reporting is efficient, but still not yet widespread.

When we look at the processes that have undergone change, we find that less than 8 percent of the institutions have recently changed their HR processes (see Table 4-7).

Of the ten HR processes studied, five were identified as being at risk by 10.5 to 17.0 percent of this study's survey respondents. Not surprisingly, perceived to be least at risk is payroll disbursement (1.3 percent), and most at risk is management and reporting processes (manage positions, 17.0 percent; record time and attendance, 15.9 percent; and manage compensation,13.4 percent. (See Table 4-8).

Table 4-6. Institutional Leaders by HR Process

HR Process	Leaders
Payroll disbursement	8.1%
Recruit employees	6.0%
Hire staff	4.7%
Administer benefits	4.5%
Produce payroll reports	4.4%
Hire faculty	4.3%
Time and attendance	3.8%
Manage labor distribution	2.7%
Manage compensation	2.6%
Manage positions	2.2%

Table 4-7. HR Processes Undergoing Most Change

HR Process	Changed
Recruit employees	7.0%
Hire staff	6.6%
Manage positions	6.4%
Manage compensation	5.2%
Record time and attendance	4.8%
Hire faculty	4.7%
Manage labor distribution	3.5%
Payroll disbursement	2.9%
Produce payroll reports	2.8%
Administer benefits	2.6%

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Table 4-8. HR Processes at Risk

HR Process	At Risk
Manage positions	17.0%
Record time and attendance	15.9%
Manage compensation	13.4%
Recruit employees	12.0%
Manage labor distribution	10.5%
Hire staff	9.5%
Hire faculty	8.0%
Administer benefits	7.1%
Produce payroll reports	3.1%
Payroll disbursement	1.3%

Interpreting the Findings

The HR area is similar to finance. They both are transactional in nature and score higher than management and management information and analysis processes. Also, like the finance area, some HR processes are more highly distributed, and more difficult to change. An example is hiring, evidenced by lower performance ratings and levels of satisfaction.

More change is on the horizon for HR. As noted, the majority of institutions have HR processes that need or have recently undergone change. This may be attributable to institutions giving HR processes lower priority. Some institutions placed student services and financial process improvement ahead of HR, because of their more strategic importance or because innovation in those areas returned more immediate and substantial benefits.

It will be interesting to see if in the future process improvement in HR will still be ignored in favor of grants administration or management information and analysis. Deferring technology investments in HR processes is not unique to higher education. According to Brown, "HR has traditionally been the last group on the totem pole to receive new technology. But that might change with the evolution of human resource management systems into cost management tools." (2004)

Finally, the areas most frequently rated as at risk—manage positions, record time and attendance, and manage compensation—were revealing. The first two processes may indicate that some institutions are still missing pieces of the technology infrastructure required for improvements in HR. Specifically, these institutions have yet to invest in either a time capture technology or a position control system. These are two areas not always supported by a base ERP package.

The processes of manage positions and manage compensation may suffer with being a politicized and diffuse responsibility, therefore one that gets low performance ratings.

Part of the problem is that opinions diverge about how to gauge whether these processes perform optimally. You might get very different answers to the question, "What would it mean to manage positions and budgets well? From the dean's viewpoint, the response might refer to successfully concealing surpluses, while from the business officer's point of view it might mean unearthing surpluses!

With manage compensation it is unclear whether respondents were evaluating infra-

structure, process, perceived salary inequities, or policy and philosophy. However, unlike the areas of position control or time capture, most ERP systems are thought to offer the majority of the capabilities needed to support compensation management. Further, the process of allocating raise pools and determining salaries is relatively straightforward. What might be at play is discomfort with compensation policy and its even-handed application. An opaque or inequitable compensation system streamlined operationally through a state-of-the-art HR information system is not likely to rate highly.

The University of Delaware has significantly streamlined its process of compensation and performance appraisal. Susan Foster describes Delaware's process. "We manage both the compensation process and employee evaluations online. The compensation process is driven by parameters derived from AAUP contracts—base increase plus merit. One can also make approved structural adjustments and promotions online. The processes dovetail with performance evaluations that are available to managers electronically."

Student Service Processes

The student area encompasses a broad set of processes that includes recruiting and admitting students; processing financial aid; billing and collecting student accounts; records; and registration. As with other categories, the student area includes transactional processes that are centrally controlled, along with highly distributed processes and strategic processes. Given this mix, the student area might be expected to exhibit a vast array of process performance. We assumed transaction processes with low resistance to change would have higher levels of satisfaction. Likewise, we expected more strategic processes to exhibit a broader distribution of results—some

institutions successfully overcoming resistance and achieving higher levels of performance, while others have struggled with change or not tried at all.

In recent years, change in the student area has been driven by the vision of one-stop services. This approach integrates various transactional and advising functions, often across departments through business process redesign, use of technology, and/or colocating offices. For example, Kathleen O'Kane, associate director of undergraduate admissions and student systems manager at UCLA, describes how her institution uses technology and collaboration to deliver on their commitment to achieve integrated services. "We look at student needs for integrated student services. Instead of students going from stovepipe office to stovepipe office, for example, to admissions to the registrar to financial aid either physically or on separate Web sites, we seek online integration. We work very closely together in the disparate offices to provide virtual one-stop shopping. In fact, we use integration of services as the major criteria to test the priorities for additional software development. Right now, we are in the process of developing an application to enable current students and alumni to order transcripts online. The student pays with a debit/credit card and the transcript is routed to the institution that the individual designates."

What We Found

Institutions were asked to assess the level of performance they had achieved for 20 student processes (see Figure 4-7). The choices were: 1) We are at risk. 2) We are adequate. Our process works for now but needs to be changed. 3) We are satisfied. Our process works adequately. 4) We are leaders. 5) We are exemplars. For a slight majority of the respondents, this area's processes were viewed as satisfied or better.

Figure 4-7. Status of Student Processes

	At risk	Adequate	Satisfied	Leaders	Exemplars
Issue transcripts (N=292)	1.4%	32.9%	57.2%	7.9%	0.7%
Verify enrollment status (N=271)	4.1%	36.9%	54.2%	4.1%	0.7%
Maintain grades (N=290)	0.7%	38.3%	44.1%	15.9%	1.0%
Audit degree completion (N=282)	20.6%	35.8%	29.4%	13.5%	0.7%
Course enrollment (N=303)	4.6%	35.6%	40.6%	18.2%	1.0%
Advise students (N=289)	12.1%	44.3%	29.8%	13.5%	0.3%
Maintain course catalog and schedule (N=304)	4.9%	44.7%	40.1%	8.6%	1.6%
Provide aid reports to lenders and agencies (N=248)	3.6%	39.5%	54.4%	2.4%	0.0%
Package loans (N=263)	6.8%	38.4%	47.9%	6.5%	0.4%
Verify aid applications (N=263)	3.0%	40.3%	51.3%	4.2%	1.1%
Determine financial need (N=279)	3.9%	41.2%	49.1%	5.0%	0.7%
Process aid applications (N=288)	5.9%	42.7%	43.4%	7.6%	0.3%
Manage receivables (N=274)	5.8%	43.8%	47.8%	2.6%	0.0%
Process payments (N=294)	2.7%	39.8%	46.3%	10.9%	0.3%
Produce student bills (N=295)	3.7%	41.0%	43.7%	10.5%	1.0%
Administer tuition and fees (N=289)	4.8%	41.9%	47.4%	4.8%	1.0%
Admit students (N=291)	5.5%	41.2%	41.2%	10.3%	1.7%
Evaluate applications (N=279)	4.7%	46.2%	36.6%	10.4%	2.2%
Manage events (N=282)	20.2%	45.0%	26.2%	8.2%	0.4%
Recruit students (N=286)	11.5%	43.7%	25.9%	16.8%	2.1%

Institutions

■ At risk ■ Adequate ■ Satisfied ■ Leaders ■ Exemplars

Table 4-9 shows the mean level of performance for student processes based on a five-point scale: 1) We are at risk. 2) We are adequate. Our process works for now but needs to be changed. 3) We are satisfied. Our process works adequately. 4) We are leaders. 5) We are exemplars. The processes are rank ordered using the mean to show the average level of process performance reported for each process.

Overall these are the highest means in the study. Transactional processes score best and management processes score lower.

In Figure 4-8, we show how the various student processes fit into our four quadrants. We were surprised to see a large standard deviation for evaluate applications and admit students. These two processes are behaving more like high-resistance processes with higher potential returns. Normally these are centralized processes, except at the graduate level. It may be that our respondents are signaling staff resistance to change in admissions offices, which are historically independent. This may also explain the high deviation for recruit students, which would seem to be a

Table 4-9. Performance of Student Processes

What level of performance has your institution achieved?	Mean	Std. Deviation
Maintain grades	2.78	0.752
Course enrollment	2.75	0.839
Issue transcripts	2.74	0.649
Student payments	2.66	0.719
Produce student bills	2.64	0.760
Admit students	2.62	0.811
Verify enrollment status	2.61	0.669
Verify aid applications	2.60	0.674
Evaluate applications	2.59	0.821
Determine financial need	2.57	0.684
Maintain course catalog and schedule	2.57	0.784
Provide aid reports to lenders and agencies	2.56	0.608
Administer tuition and fees	2.55	0.711
Package loans	2.55	0.734
Recruit students	2.54	0.972
Aid applications	2.54	0.736
Manage receivables	2.47	0.647
Advise students	2.46	0.885
Audit degree completion	2.38	0.981
Manage events	2.23	0.878

Quadrant 4 process, even though it is centralized. High standard deviations may also signify real differences in admissions practices in so-called open enrollment institutions and highly selective institutions. Well-subscribed institutions with open enrollment policies and selective public institutions can rely nearly entirely on their transaction systems to manage the process. Highly selective institutions and economically challenged private institutions must depend on a wider array of labor intensive programs and interventions to admit students.

An alternative explanation for some of the results (especially those in Quadrant 1 with higher standard deviations—all bursar functions) may be that the high number of students affected by the process drove institutions to invest in improvement even in the face of high resistance. Institutions may have focused more effort on these because improvement increases student satisfaction.

Manage events behaves much like the process record time and attendance in HR. Many admissions packages are not as proficient in dealing with this function. Institutions may still be using a variety of shadow systems to plan, execute, and evaluate the effectiveness of recruiting events. Customer relationship management (CRM) systems may bridge this gap in the future. It is also possible that respondents interpreted this process to include those components of event management that are outside the purview.

We grouped the responses into two sets: 1) less satisfied, which included institutions that indicated that a process was at risk, and adequate but needed to be changed, and 2) satisfied, which included institutions that indicated they were satisfied, leaders, or

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Low   ⟵   Strategic Impact   ⟶   High

High

Quadrant 2
High Resistance/Local Return

Admit students (2.62/.811)
Evaluate applications (2.59/.821)
Maintain course catalog and
   schedule (2.57/.784)

Quadrant 4
High Resistance/High Return

Recruit students (2.54/.972)
Advise students (2.46/.885)
Audit degree completion
   (2.38/.981)
Manage recruiting events
   (2.23/.878)

Breadth of Political Engagement

Quadrant 1
Low Resistance/Local Return

Maintain grades (2.78/.752)
Issue transcripts (2.74/.649)
Process payments (2.66/.719)
Produce student bills (2.64/.760)
Verify enrollment status (2.61/.669)
Verify aid applications (2.60/.674)
Determine financial need
   (2.57/.684)
Provide aid reports to lenders,
   agencies, and auditors (2.56/.608)
Package loans (2.55/.734)
Administer tuition and fees
   (2.55/.711)
Process aid applications
   (2.54/.736)
Manage receivables (2.47/.647)

Quadrant 3
Low Resistance/High Return

Low

The figures in the quadrants are (mean/std. deviation)

**Figure 4-8.
Student Processes**

exemplars (see Figure 4-9). The findings confirm the weakness of management processes and strength of transactional processes. The processes of advising students and auditing degree completion varies significantly among institutions, making standardization more problematic.

Fully 18.5 percent considered themselves leaders in course enrollment, which was the highest score in the study (see Table 4-10). More than 10 percent of institutions rated themselves as leaders or higher in nine processes. Not one institution regarded itself as an exemplar on manage receivables and provide aid reports to lenders and agencies (see Figure 4-7)

Not surprisingly the processes being improved are directly related to revenue and quality of the institution. Three of the top five processes for which institutions said they were leaders directly relate to student recruitment and retention.

Audrey Lindsay, associate registrar and director of student systems, noted that her institution, The University of British Columbia (UBC), "at a strategic level wanted to improve the experience for incoming students, improve the level of service to them, and speed up the process. Our processes were not scaleable—if applicants doubled, staff would need to double. UBC sped up the application process without increasing staff by allowing applicants to self-evaluate and admit themselves to the university. Previously, all of the new high school applicants (40 percent of their applicants) applied online, and it took weeks or
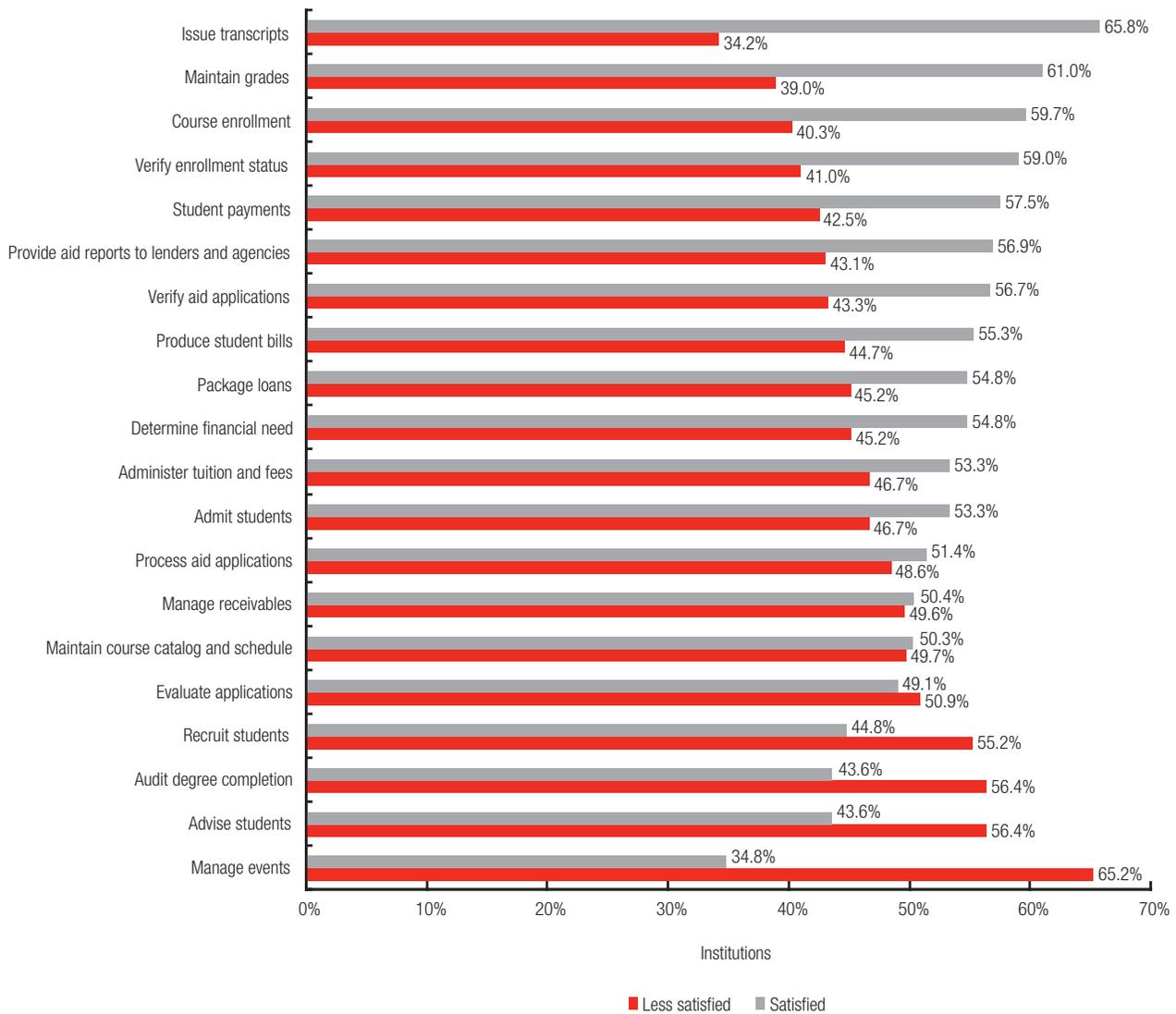
Figure 4-9. Satisfaction with Student Process Performance

months to admit them because the admissions office needed to wait for interim grades to be amalgamated and passed from the schools to the university in May or for final grades in July. Acceptance to many programs at UBC is based on a grade average in specific courses. What this meant was a final decision could not be made until final grades were received. UBC built a simple interface that enables applicants to directly enter their courses and interim grades. The courses and grades are reviewed online by a rules engine, which incorporates the various admissions rules. The system then tells the applicant whether they are admissible or if not, why not. If they are not admissible to their first choice, applicants are able to evaluate themselves on their second choice as well. The offer is firm if the applicant maintains his or her grades. By allowing students to enter their grades, decisions are made quicker. UBC is making more offers earlier and has a better and earlier prediction of the student pool. This has eliminated a lot of manual work and sped up the process significantly—the entire process from application to admission can be done in 15 minutes."

Table 4-10. Institutional Leaders by Student Process

Student Process	Leaders
Course enrollment	18.5%
Recruit students	17.1%
Maintain grades	16.1%
Audit degree completion	13.1%
Advise students	12.9%
Evaluate applications	11.8%
Admit students	11.3%
Produce student bills	11.0%
Student payments	10.7%
Maintain course catalog and schedule	9.8%
Issue transcripts	8.2%
Manage events	8.0%
Process aid applications	7.6%
Package loans	6.5%
Administer tuition and fees	5.6%
Determine financial need	5.5%
Verify aid applications	5.1%
Verify enrollment status	4.5%
Manage receivables	2.4%
Provide aid reports to lenders and agencies	2.3%

Elizabeth Unger, vice provost for academic services and technology and dean of continuing education at Kansas State University, describes the changes made by her institution. "We wanted to give better advice to our students, to advise students at a distance, and to allow advisers more time for students by replacing or making easier routine tasks. Our online advising system uses online chat and it brings up a degree audit report so both student and adviser can see it. The online advising process has increased the quality of advising and has reduced the time to complete necessary, time-consuming tasks such as routine communications, tracking advising sessions, and recording advice given the student. The system also facilitates answers to 'what if' questions such as, 'What if I change my major?'"

Mark Gold, director of information technology services at Brooklyn College, describes the institution's degree audit and transfer student processes. "We integrated the online advising/degree audit function into our student services portal and are partnering with our City University of New York (CUNY) peers to create a tuition assistance program (TAP) audit function to help students and advisers identify any problems with TAP eligibility, and to integrate the system into CUNY's transfer evaluation systems. We built a custom front-end for the degree progress reports and created a special query tool that college advisement staff use to cull progress reports by a variety of advisement related criteria. We are also working to build a planning tool that would use the degree progress information to help the college determine which courses

to offer each term to best meet our students' curriculum needs. The online advising/degree audit function dovetailed nicely into our portal and our extensive suite of online self-service tools. Our goal is to help our students navigate their academic career efficiently and thereby improve retention, graduation rates, efficient allocation of our course seats, and most important, the satisfaction of our customers. Of course we certainly hope we never again have students learn they will not graduate as expected in what they perceive to be their final term. We are encouraging our students to track their progress towards their degree early on and often."

When we look at the processes that institutions are currently changing, we see that fewer than 10 percent of the institutions have recently changed their student services processes (see Table 4-11).

Especially noteworthy is the overall perceived lower level of risk for these processes (see Table 4-12). Anecdotal evidence suggests that institutions have been working to implement process improvement in the student area for almost as long as in the finance area. These efforts both preceded and followed the implementation of major new technology. This attention appears to have enabled institutions to achieve lower levels of risk.

Many respondents also view student services as a more strategic area. The benefits of process improvements are immediately evident to students and contribute greatly to their success and satisfaction. And, students are more likely to actively complain or seek a solution to things that they do not like. When students convey opinions—formally or informally—about what process needs

Table 4-11. Student Processes Undergoing Most Change

Student Process	Changed
Recruit students	9.2%
Audit degree completion	7.8%
Advise students	6.5%
Administer tuition and fees	5.9%
Admit students	5.8%
Manage events	5.7%
Evaluate applications	5.4%
Verify aid applications	5.4%
Verify enrollment status	5.2%
Package loans	5.1%
Manage receivables	4.9%
Produce student bills	4.8%
Process aid applications	4.6%
Maintain grades	4.6%
Determine financial need	4.5%
Issue transcripts	4.3%
Student payments	4.2%
Provide aid reports to lenders and agencies	4.2%
Maintain course catalog and schedule	3.8%
Course enrollment	3.8%

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Table 4-12. Student Processes at Risk

Student Process	At Risk
Manage events	19.1%
Audit degree completion	19.0%
Advise students	11.3%
Recruit students	10.5%
Package loans	6.5%
Manage receivables	5.6%
Process aid applications	5.6%
Admit students	5.2%
Maintain course catalog and schedule	4.7%
Administer tuition and fees	4.6%
Evaluate applications	4.4%
Course enrollment	4.4%
Determine financial need	3.8%
Verify enrollment status	3.8%
Produce student bills	3.5%
Provide aid reports to lenders and agencies	3.5%
Verify aid applications	2.9%
Student payments	2.6%
Issue transcripts	1.3%
Maintain grades	0.7%

fixing and how, they often act as catalysts for innovation.

Interpreting the Findings

The results for the student area follows the pattern found in the other process areas. Institutions have made more progress improving transactional processes like maintaining grades, registering students for courses, issuing transcripts, and processing payments. More strategic, managerial processes, such as advising, score lower.

As in other areas, some processes produced unexpected results. For example, institutions might be expected to be more satisfied with audit degree completion than the results indicate. Since the process is rule-based it would be assumed to behave like a transaction process. However, it scored among the lowest of the processes.

This could be attributable to several factors. Institutions may be encountering more resistance than expected to changing or automating the process. The resistance may be reluctance to codify the specific requirements for degree completion in different programs in a form that would allow it to be automated or provided as a self-service function. Automation might also mean relinquishing control by those individuals who currently clear degrees and perhaps a loss of jobs.

Also, institutions often make exceptions to core requirements. Or they may have nuances in requirements, with varying expectations for students even within the same cohort. Often faculty members are divided about transfer credits, especially with study abroad courses. And degree clearance is often tied to the advising process, which can be unstructured.

Lastly, institutions may be lacking a piece of the systems infrastructure necessary to achieve better self-service or automation. For example, not all student information systems include in their base system a sophisticated degree audit capability. This is often an area where institutions elect to make a supplemental investment.

Similarly the manage events process, which entails planning recruiting events and monitoring their effectiveness, is behaving like a management information and analysis process. Institutions may find performance in this area is hampered by the same factors that limit management information and analysis, including gaps in system capabilities, not capturing the right data, and not having staff accustomed to managing with data.

Grants Management Processes

The grants management category includes processes both pre- and post-award grants management. It encompasses the highly rule-driven commodity processes such as reporting time and effort and providing grant reports. This category also contains processes that are more strategic and idiosyncratic such as preparing grant proposals, tracking grant budgets, and approving grant proposals.

The grants management processes are harder to change for several reasons. First, they exist in a complex, ever-changing, and poorly understood regulatory environment crossing multiple jurisdictions. Second, the area has many stakeholders with individual preferences and/or requirements that must be considered before any improvement effort. This is especially the case at research-intensive institutions that receive grants from diverse sources all with different rules—the National Science Foundation, National Institutes of Health, Department of Defense, and NASA. Third, internal control of the processes is often distributed. This is especially true in large in-

stitutions where many colleges and academic departments play a significant role in grants management.

For these reasons, we expect to find that institutions have achieved high levels of performance in the grants management area. The payoff of improvement is high, but so is the difficulty of attempting change, and the pain of failure.

What We Found

Institutions were asked to assess the level of performance they had achieved for five grants proposal processes (see Figure 4-10). The choices were: 1) We are at risk. 2) We are adequate. Our process works for now but needs to be changed. 3) We are satisfied. Our process works adequately. 4) We are leaders. 5) We are exemplars.

The results indicate that institutions may just be attempting more change in this area. In fact, a significant majority of the institutions are in the process of change or recognize a need for change.

Table 4-13 shows the mean level of performance for grants processes based on a five-point scale: 1) We are at risk. 2) We are adequate. Our process works for now but needs to be changed. 3) We are satisfied. Our process works adequately. 4) We are leaders. 5) We are exemplars. The processes are rank ordered using the mean to show the average level of process performance reported for each process.

On the whole, institutions ranked themselves barely above adequate. The differences are small, ranging from a mean of 2.06 to 2.18 with fairly consistent standard deviations for each process.

The small differences in grant reporting and reporting time and effort are not surprising, as the regulatory environment and grant agencies play a major role in defining how these processes work. Therefore, for both, resistance to change should be low.

Figure 4-10. Status of Grants Management Processes
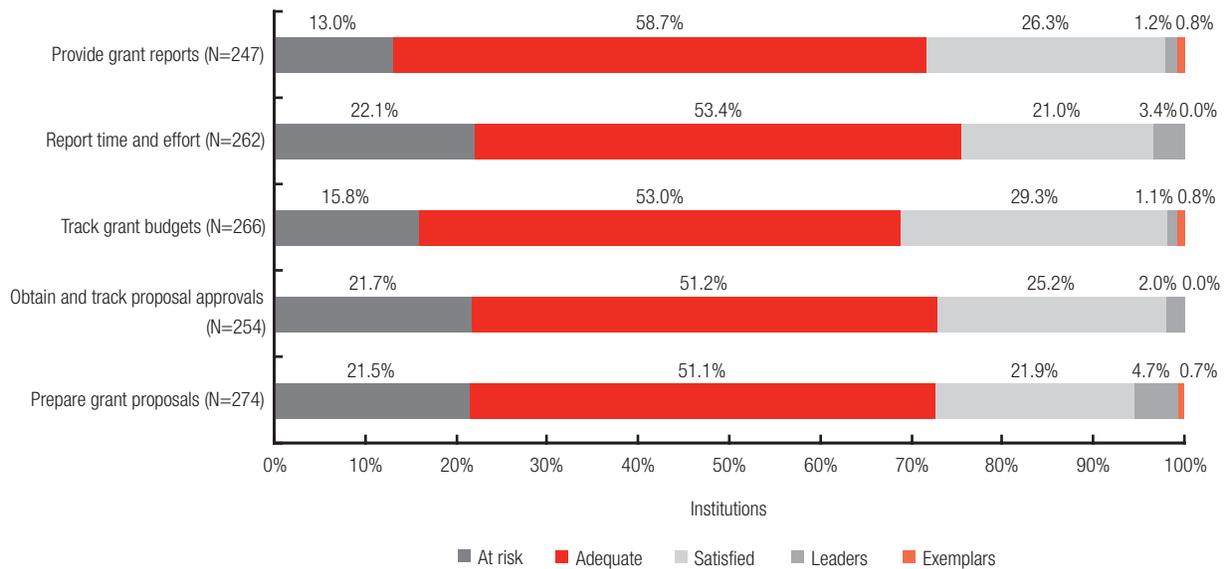
Table 4-13. Performance of Grants Management Processes

What level of performance has your institution achieved?	Mean	Std. Deviation
Provide grant reports	2.18	0.695
Track grant budgets	2.18	0.73
Prepare grant proposals	2.12	0.823
Obtain and track proposal approvals	2.07	0.737
Report time and effort	2.06	0.753

And once the basic technology and process infrastructure are in place, most institutions should be able to achieve satisfactory levels of performance.

The University of California at San Diego (UCSD) has developed an application to facilitate both the reporting and review of transactions for risk (financial reconciliation). Elazar Harel, assistant vice chancellor for administrative computing and telecommunications, describes UCSD's application. "We were spending a lot of time on financial reconciliation involving federal grant money. In fact, many employees spent multiple days every month on this tedious process. We built a system that performs risk-based reconciliation and statistical sampling. The system tells the users what transactions need to be reconciled each month. The percentage of transactions reconciled declined from 100 percent to about 5 percent. Some transactions were very small in dollar value and resulted in a very low sampling rate (low risk), while others were 100 percent eligible due to their large dollar amount or other risk criteria."

To further demonstrate the difficulty of higher education with its grants processes, we grouped the responses into two sets: 1) less satisfied, which included institutions that indicated that a process was at risk or was adequate for now and 2) satisfied, which included institutions that indicated they were satisfied, leaders, or exemplars (see Figure 4-11). We find that there is overall less satis-

faction with these processes with no process doing better that 31.2 percent.

Few institutions see themselves as leaders in the grants management area and only grant preparation gets a score above 5 percent (see Table 4-14). Not one institution regarded itself as an exemplar on obtaining and tracking proposal approvals and on reporting time and effort (see Figure 4-10).

Of the processes undergoing change, less than 8 percent of the institutions have recently changed their grants processes (see Table 4-15), despite relatively low satisfaction with the performance of current grants management process. We attribute these findings to the relatively higher risk of changing these processes. Interestingly, Carnegie class does not appear to play a role in determining either institutional satisfaction with these processes

or plans to introduce change. So, we cannot assume that those who are dissatisfied and not planning change are only those institutions where research grants are a relatively small part of what they do.

Especially noteworthy is the perceived at risk status of processes, three of which were considered at risk at approximately 20 percent of institutions in the study (see Table 4-16). This is a finding that merits closer investigation. The scope of this analysis did not provide us with insight into the severity of the risks being faced or the investment required for mitigation. However, what does stand out is the large number of respondents who indicated that one or more of their grants management processes are at risk. If the concern is related to compliance, service failure, failing technology, or some combination of

**Figure 4-11. Satisfaction with Grants Management Process Performance**

Figure 4-11. Satisfaction with Grants Management Process Performance
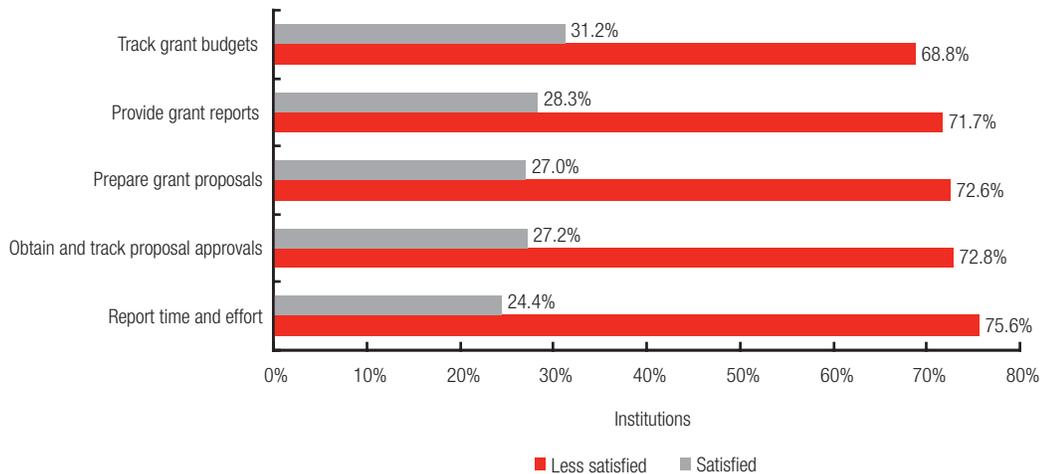
Table 4-14. Institutional Leaders by Grants Management Process

Grants Management Process	Leaders
Prepare grant proposals	5.2%
Report time and effort	3.2%
Obtain and track proposal approvals	1.9%
Provide grant reports	1.9%
Track grant budgets	1.7%

Table 4-15. Grants Management Processes Undergoing Most Change

Grants Management Process	Changed
Track grant budgets	7.6%
Provide grant reports	6.4%
Obtain and track proposal approvals	5.9%
Report time and effort	5.4%
Prepare grant proposals	4.9%

Table 4-16. Grants Management Processes at Risk

Grants Management Process	At Risk
Report time and effort	20.9%
Prepare grant proposals	20.5%
Obtain and track proposal approvals	20.4%
Track grant budgets	14.6%
Provide grant reports	12.1%

factors, the finding is worthy of deeper analysis and intervention at the institutional level. Alternatively, these ratings could describe a tremendous opportunity for organizations interested in improving a set of complex, but critical, higher education processes.

Interpreting the Findings

Grants management has been a challenging area in which to achieve process improvement. The few pioneers who focused early reengineering efforts on grants management experienced strong cultural resistance to change. While many institutions recognized the need for improvement, it proved difficult to forge a consensus among deans, researchers, departmental business administrators, and the central administration. In some institutions, there were (and in some cases still are) administrators who derive significant authority and security from their ability to navigate the grants management processes on behalf of faculty. In contrast, some institutions have managed to establish ownership of the grants management process in an office of grants and contracts.

At research-intensive universities, the management of the grants process is complicated by the existence of multiple research cultures. The application for grants from different state and federal agencies is encumbered with a multiplicity of rules about what and who can be funded, for when and how things can be paid. In land-grant universities, most agricultural research is funded by the states, not by the federal government. This has led to separate management entities in universities that have to address varying problems, policies, and processes. The melding of these units into a single entity and a comprehensive management process has been difficult to achieve.

The grants management area must deal with an extraordinary complex regulatory environment—financial, environmental, privacy, and animal use, to name but a few. All the regulations contribute to the high level of perceived risk and the need for change

reported by the respondents. Some of grants management innovators succeeded in part because of significant pressure from the federal government enacted in response to highly visible improprieties by researchers at their institution. Under such circumstances, cultural and organizational barriers for change could be overcome.

The challenge in grants management also relates to organization structure. Unlike the finance area, there is typically no single owner of grants management processes. Often, the post-award processes report to the chief financial officer, while the pre-award processes report to the provost or vice provost for research. In larger institutions, each school with significant research volume will also have several local processes and research support organizations. So, many institutions found they first had to reorganize (merge pre- and post-award research administration) before they could begin to improve their grants management processes.

Finally, the technology available to support grants management has lagged behind other process areas. Initially, major ERP vendors did not include grants management modules in their products. This was especially true of corporate ERP vendors who evolved their products to work in higher education. These firms focused first on creating HR, financial, or student information systems and have only recently begun to offer fully developed grants management modules.

The University of Central Florida (UCF) developed its own grants management system. According to Joel Hartman, vice provost for information technologies and resources, "UCF developed a grants management system in house because we felt that most ERP systems did not have an adequate grant/research component. We needed better information, tracking, and monitoring of grants and research activities. Our contracts and grants office did not participate in our ERP implementation. Instead, they developed a local system that supports all the grant activity, research information, CVs, and project deliverables. It enables a comprehensive view of research across the institution; it pulls data out of other systems, but treats it in a holistic manner. We call it ARGIS. There has been interest by other institutions in adopting this system."

Management Information and Analysis Processes

The management information and analysis category is somewhat different than the others in this study. The processes chosen are not processes, per se. Rather, they represent managerial capabilities. However, like processes they require both strong technology and skilled people to perform them well. Also, like processes, they rely on people changing their skills, attitudes, and approaches to work in order to achieve higher levels of performance. And like the processes in our study, the ease and difficulty to change them varies significantly.

What We Found

Institutions were asked to assess the level of performance they had achieved for four management and analysis processes (see Figure 4-12). The choices were: 1) We are at risk; 2) We are adequate. Our process works for now but needs to be changed. 3) We are satisfied. Our process works adequately. 4) We are leaders. 5) We are exemplars. As with grants management, the majority of institutions view themselves at risk or needing change. Management information and analysis, in this study, is for our respondents collectively the most problematic functional area.

Table 4-17 shows the mean level of performance for management information and analysis based on a five-point scale: 1) We are at risk. 2) We are adequate. Our process

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Figure 4-12. Status of Reporting and Analysis Processes
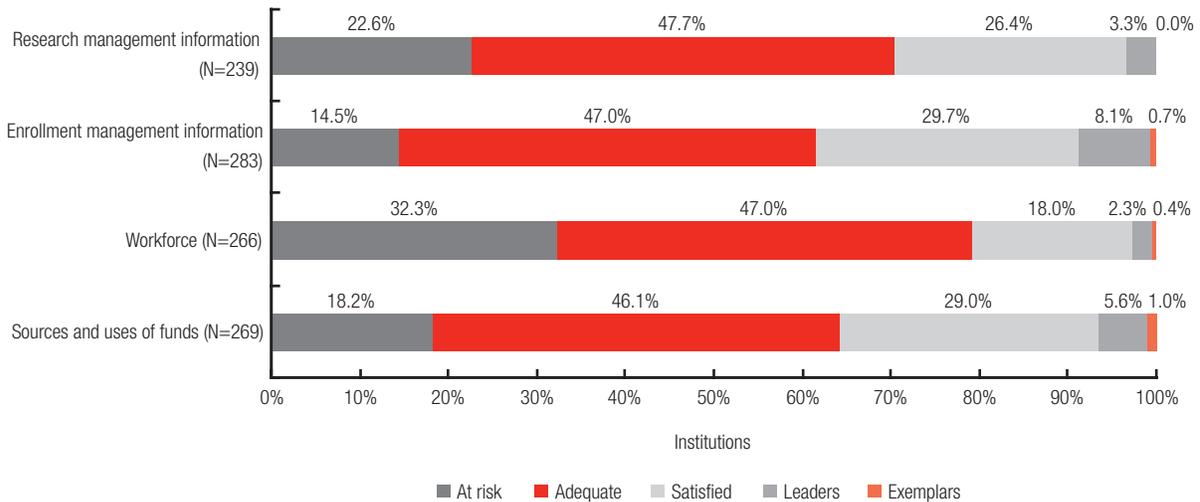
Table 4-17. Performance of Reporting and Analysis Processes

What level of performance has your institution achieved in reporting and analysis?	Mean	Std. Deviation
Enrollment management information	2.34	0.849
Sources and uses of funds	2.25	0.857
Research management information	2.1	0.784
Workforce	1.91	0.789

works for now but needs to be changed. 3) We are satisfied. Our process works adequately. 4) We are leaders. 5) We are exemplars. The processes are rank ordered using the mean to show the average level of performance reported for each process.

On the whole, institutions ranked themselves as adequate at best. The differences are small ranging from a mean of 2.34 to 1.91. Reporting and analysis of the workforce received the lowest mean in the entire study, 1.91.

To further demonstrate the difficulty of higher education with management information and analysis, we grouped the responses into two sets: 1) less satisfied, which included institutions that indicated that a process was at risk or was adequate for now and 2) satis-

fied, which included institutions that indicated they were satisfied, leaders, or exemplars (see Figure 4-13). We again see analysis of the workforce scoring low with nearly 80 percent being less satisfied. Enrollment management information does best with a satisfaction score of 38 percent.

It is not surprising that enrollment management has the highest percentage of satisfied institutions (61.5 percent) and that the analysis of workforce is lowest (79.3 percent). The enrollment management area would likely have better analytical and reporting capacity for several reasons. For the majority of institutions, tuition revenue is the major revenue stream managed by the institution (management of the endowment is often handled by outside investment managers). So, a strong

**Figure 4-13.
Satisfaction with
Management
Information and
Analysis Process
Performance**
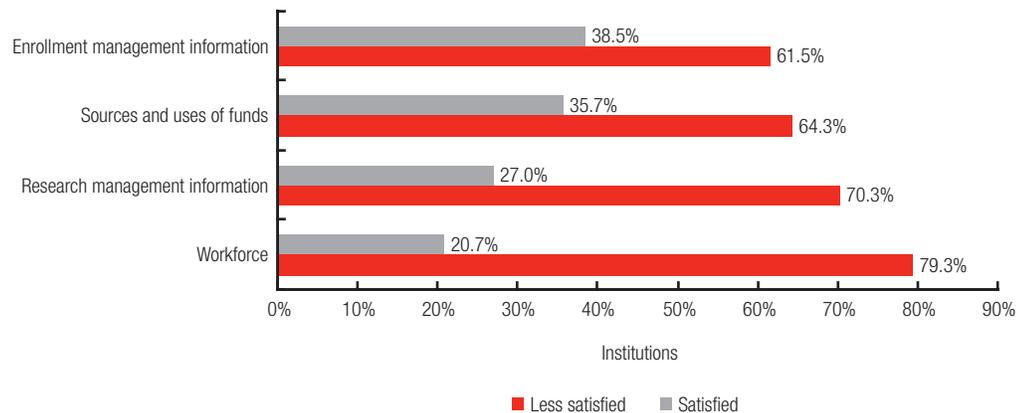
reporting and analytical capacity should be the highest priority. Second, enrollment management professionals have a strong history of managing with data.

Susan Klopman, dean of admissions and financial planning at Elon University, describes the importance of enrollment information. "The basis of every decision is data. In the final analysis we may use intuition, but we examine data first. We have an ERP system that really supports us, and we built an online application system that captures a lot of additional data. Elon University has had a 50 percent growth in applications in the last nine years. The quality of enrolling students has increased every year. Our acceptance rate dropped from 64 percent to 41 percent." Admissions offices have for a long time used data to analyze their student yield, develop recruitment strategies, and to monitor success. We would expect them to demand and obtain increasingly sophisticated management information and analysis tools and capacity.

The relatively low levels of satisfaction with the capacity to perform workforce analysis has several potential root causes:

◆ Higher education HR professionals may not manage with data to the same extent as enrollment management professionals;

◆ Workforce data may still be housed in fragmented shadow systems maintained

outside of the human resource office; and

◆ Improvement efforts in the HR management area may still be primarily focused on transactional activities such as hiring and payroll processing.

Not surprisingly, the process with the highest level of satisfaction also was also where institutions reported the highest level of improvement—enrollment management (9.7 percent, see Table 4-18). Note that not one institution reported itself as an exemplar on research management information (see Figure 4-12). Less than 1.0 percent of the respondents considered their institution to be exemplars in this functional area. Again, this is understandable given the results documented in the grants management section of this chapter. Institutions are struggling to improve the transactional-level services in grants management. Whether due to cultural constraints, technology limitations, or lack of resources, for most institutions improving research management information is still on the horizon.

The percentage of institutions that had recently changed these process ranges from 6.3 percent to 2.4 percent (see Table 4-19).

Like the grants management processes, the findings for the management information and analysis processes are noteworthy because of the significant number of institutions

that reported they were at risk in this area. The risk for the workforce area was scored above 30 percent (see Table 4-20).

It is possible that risk in this area is a proxy for change. The institutions that said that they are at risk in these areas may not be facing an acute compliance risk or major service failure. Rather, they may feel they are at risk because their infrastructure is not well positioned to meet a growing demand for information and analysis.

John Bielec, vice president of information technology and CIO at Drexel University, describes the infrastructure that Drexel has deployed to facilitate reporting: "Outputs are generated by either Web products that Drexel has developed or built on Brio (now Hyperion) queries against our Oracle-based data warehouse. Any specialized report or analysis a particular office may need is available via existing report repositories or can be easily built on an ad hoc basis."

The gap could be both one of technology and staff skills. If this is true, we should see a significant investment in solutions in this area.

Interpreting the Findings

Institutions seem to be dissatisfied with much of their management information and analysis capability in general and specifically for workforce and research management information. This is both understandable and troubling. Understandable, because management information is often a lagging capability enhanced after institutions have improved the underlying transaction processes and information systems. Troubling because so

Table 4-18. Institutional Leaders by Management Information and Analysis Process

Reporting and Analysis Process	Leaders
Enrollment management information	9.7%
Workforce	7.4%
Sources and uses of funds	8.6%
Research management information	3.3%

Table 4-19. Reporting and Analysis Processes Undergoing Most Change

Reporting and Analysis Process	Changed
Enrollment management information	6.3%
Workforce	6.0%
Sources and uses of funds	4.6%
Research management information	2.4%

Table 4-20. Reporting and Analysis Processes at Risk

Reporting and Analysis Process	At Risk
Workforce	30.4%
Research management information	22.0%
Sources and uses of funds	17.4%
Enrollment management information	13.6%

many respondents view two of the most critical areas to higher education—research and the management of the workforce—to be at risk.

As noted in the prior section, institutions have struggled with both the difficulty of process change and the lack of fully developed technology solutions for grants management. This may be a significant contributor to the relative dissatisfaction with research management information as well.

The causes of dissatisfaction with workforce analysis may be equally numerous and complex. Institutions may not be capturing the right information about their workforce to be able to do the appropriate kind of analysis. A Minnesota legislator once asked the University of Minnesota's lobbyist, "Stan, how many people work at the U?" Stan answered, "About half." But the reality was that Stan didn't know the number for the reasons mentioned previously.

Few institutions have captured the data required to identify gaps in employee skill sets or to predict future HR needs based on assumed retirement dates. In addition, workforce management reporting is also complicated by the organization. In most institutions, HR does not have the entire responsibility of tracking workforce information. Often, the offices of deans and provost track faculty information. The data may be tracked in separate systems outside the HR system. Either for technical or cultural reasons, institutions may not yet have created reporting repositories that compile all information in one place. Also, coding may be flawed, and historical data may be unavailable or coded differently.

However, the higher level of satisfaction with enrollment management reporting and information is understandable. There is a long tradition in the admissions profession of managing with data. Student recruitment strategies are routinely shaped by more data intensive analysis than other management functions. Institutions routinely hire outside strategy firms to analyze the data relating to their market and enrollment prospects. And so, there is an existing demand for data and a comfort with its use in the enrollment function. Coupled with this is the significant number of institutions dependent upon tuition revenues or are in highly competitive market to recruit students and it is clear why effort is put into creating analytical capabilities first into this area.

5
Cross Business Area Performance

Competence, like truth, beauty, and contact lenses,
is in the eye of the beholder.
—Laurence J. Peter

In the previous chapter we mapped business process performance within five functional areas and found some variation within each, especially between management processes (weakest), monitoring and reporting (less weak), and transactional process (strongest). But overall, the variation within each functional area was small. We found much greater variation across functional areas. Perceptions of the performance of grants management and management information and analysis lag behind financial and human resources. Processes that support students were rated the best performing by survey respondents.

Processes at Risk

Table 5-1 shows that six of the 10 processes at risk at the greatest number of institutions (over 15 percent) are in the areas of management information and analysis and grants management.

Equally disconcerting is that 60 percent of the grants management processes and 50 percent of the grants monitoring and reporting processes were deemed at risk by over 15 percent of the respondents. This compares with 0 percent for finance, 10 percent for HR, and 5 percent for students. Further, no financial process was reported at risk by more than 10 percent of the institutions.

Key Findings

◆ Student processes had both the highest performance ratings and the greatest variability among institutions.
◆ Transactional processes, especially in HR and finance, had the least variability among institutions.
◆ Of the 11 processes on which more than 10 percent of institutions rated themselves as leaders, nine are student processes and two are financial processes.
◆ Management information and analysis processes are undergoing the greatest amount of change.
◆ Despite the low rankings respondents gave to their grants management processes, only one grants management subprocess (track budgets) was in the top six processes undergoing change.

Less than 5 percent of institutions classify 17 of 48 processes (35 percent) of all processes at risk. (see Table 5-2).

No grants management or management information and analysis process scored this well. Student did best (60.0 percent of processes), followed by financial (33.3 percent) and HR (20.0 percent). This is further

Table 5-1. Processes Deemed at Risk at More Than 15 Percent of Institutions

Process	Percent at Risk	Area
Workforce	30.4%	Management information and analysis
Research management information	22.0%	Management information and analysis
Report time and effort	20.9%	Grants management
Prepare grant proposals	20.5%	Grants management
Obtain and track proposal approvals	20.4%	Grants management
Manage events	19.1%	Student
Audit degree completion	19.0%	Student
Sources and uses of funds	17.4%	Management information and analysis
Manage positions	17.0%	HR
Record time and attendance	15.9%	HR

Table 5-2. Processes Deemed at Risk at Less Than 5 Percent of Institutions

Process	Percent at Risk	Area
Maintain course catalog and schedule	4.7%	Student
Administer tuition and fees	4.6%	Student
Evaluate applications	4.4%	Student
Course enrollment	4.4%	Student
Cash receipts	4.2%	Financial
Determine financial need	3.8%	Student
Verify enrollment status	3.8%	Student
Produce student bills	3.5%	Student
Provide aid reports to lenders and agencies	3.5%	Student
Create accounts	3.3%	Financial
Produce payroll reports	3.1%	HR
Verify aid application	2.9%	Student
Student payments	2.6%	Student
Payroll disbursement	1.3%	HR
Issue transcripts	1.3%	Student
Fulfill check requests	1.2%	Financial
Maintain grades	0.7%	Student

evidence of the relatively greater progress made in these areas as compared with grants management and management information and analysis.

Processes Scored as Satisfactory

We also compared levels of satisfaction singling out those processes that were scored as satisfied (satisfied, leader, or exemplar) at 50 percent or more of the institutions (see Table 5-3).

Again we see the domination of the student area, with 70 percent of all student processes scored as satisfied or better at more than 50 percent of the institutions, fol-

lowed by financial (55.6 percent) and HR (20 percent). Grants management and management information and analysis both scored 0 percent in this category.

We then looked at the areas with less satisfaction at two-thirds of the institutions (see Table 5-4). Thirteen of 48 processes fell into this category.

Over half of these were in grants management and management information and analysis, despite the fact the two areas combined represent only 18.8 percent of the processes studied. Respondents were less satisfied with all of the grants processes and 75 percent of the reporting processes. One (11.1 percent) financial process, zero (0 percent)

Table 5-3. Processes Scored as Satisfied or Better at 50 Percent or More Institutions

Process	Percent Satisfied	Area
Issue transcripts	65.8%	Student
Payroll disbursement	63.5%	HR
Maintain grades	61.0%	Student
Course enrollment	59.7%	Student
Verify enrollment status	59.0%	Student
Student payments	57.5%	Student
Provide aid reports to lenders and agencies	56.9%	Student
Purchase small-dollar items	56.3%	Financial
Produce payroll reports	55.7%	HR
Verify aid application	56.7%	Student
Produce student bills	55.3%	Student
Determine financial need	54.8%	Student
Package loans	54.8%	Student
Pay invoices	54.1%	Financial
Create accounts	54.5%	Financial
Administer tuition and fees	53.3%	Student
Admit students	53.3%	Student
Prepare external financial statements and reports	52.9%	Financial
Fulfill check requests	51.2%	Financial
Manage receivables	50.4%	Student
Maintain course catalog and schedule	50.3%	Student

Table 5-4. Processes Rated as Less Satisfied at 66 Percent or More Institutions

Process	Percent Less Satisfied	Area
Workforce	79.3%	Management information and analysis
Report time and effort	75.5%	Grants
Develop budgets	74.0%	Financial
Obtain and track proposal approvals	72.8%	Grants
Prepare grant proposals	72.6%	Grants
Record time and attendance	72.6%	HR
Provide grant reports	71.7%	Grants
Research management information	70.3%	Management information and analysis
Track grant budgets	68.8%	Grants
Manage positions	69.6%	HR
Manage compensation	66.5%	HR
Recruit employees	66.2%	HR
Sources and uses of funds	66.0%	Management information and analysis

student processes, and four (44.4 percent) HR processes fell into this category.

Interpreting the Results

Exercise caution when considering the significant number of respondents who described their grants management and management information and analysis processes as at risk. It is not possible to determine from the data exactly the severity or nature of the risk, and it would be wrong to conclude that these results confirm significant compliance risk or a high likelihood of business failure. What is clear is that these two areas are underperforming relative to the other major process areas studied.

One explanation for lower levels of performance is the inadequacy of resources to maintain technology. S.W. Hollingsworth, CIO at Texas Wesleyan University, describes their situation. "Probably, like the majority of small schools in Texas, we are fighting reduced revenue from lower enrollment. I think it would be safe to say that several areas in our IT organization are falling into the at risk

category with insufficient funding being the root cause."

The assessment of management reporting may be lower because institutions are just starting to understand how and where to use data to support decision making. Some institutions do not have significant experience managing with data, nor do they place a high value on quantitative analysis. Such institutions may report that they are at risk because they are not prepared to use the capabilities of their management reporting tools and infrastructure.

Al Dees, director of computing services at the College of St. Catherine, notes his institution's lack of experience managing with data. "I am most concerned about the fact that we do not have a history of using standard financial reports. There is no history of senior management and the board expecting or needing these reports. It is a risk situation, which two years ago resulted in a surprise financial situation—a shortage of funds. The situation is beginning to change, but there is still a lack of sufficient demand for information

from senior managers to push our systems to do what we require."

Leading Processes

The student area totally dominates the leadership category (see Table 5-5). Of the 11 processes in which institutions indicated that 10 percent or more of them were leaders or exemplars, nine are in the student area and two are in the financial area. All involve processes that are transactional. The majority of the processes are strategic processes that offer a high return (e.g., advise students and degree audit) or commodity processes that offer significant opportunities to improve the satisfaction of a large number of users (e.g., course enrollments and maintain grades).

It appears that respondents have had great interest and success in pursuing innovative practices in the student area. This may be attributable to an institution's recognizing the importance of improving student satisfaction. Or, it may be evidence of how quickly students have come to expect a significant degree of self-service and technology-enabled processes at their institution. Competition among higher education institutions for students requires them to continuously

innovate in the student area in order to keep pace with such rising expectations.

Another potential reason more institutions pursued and reported being leaders in the student area is its impact on revenues. Recruiting students, audit degree completion, and advising students all affect institutional revenues. As a consequence, it may be that institutions have an easier time creating a case for investment in student processes.

Cincinnati State Technical and Community College is an example of the many institutions that designated improvements to student services as the highest priority. CIO Mark Cain describes his institution's approach: "The first thing I tackled was improving student services on the Web. We put together a standard suite of Web-based services—registration, bill payment, financial aid award checking, online degree audit, checking your grade, and transcript requests. We are focusing on getting rid of lots of the paper that historically has been used in support of this institution's operations."

Conversely, processes that have the fewest leaders and exemplars are management, or reporting processes and functions regardless of business area (see Table 5-6).

Table 5-5. Processes with 10 Percent or More Institutional Leaders

Process	Percent Leaders	Area
Course enrollment	18.5%	Student
Recruit students	17.1%	Student
Maintain grades	16.1%	Student
Purchase small-dollar items	13.9%	Financial
Audit degree completion	13.1%	Student
Advise students	12.9%	Student
Evaluate applications	11.8%	Student
Admit students	11.3%	Student
Produce student bills	11.0%	Student
Track budgets and expenditures	10.8%	Financial
Student payments	10.7%	Student

Table 5-6. Processes with 3 Percent or Less Institutional Leaders

Process	Percent Leaders	Area
Manage labor distribution	2.7%	HR
Manage compensation	2.6%	HR
Manage receivables	2.4%	Student
Provide aid reports to lenders and agencies	2.3%	Student
Manage positions	2.2%	HR
Obtain and track proposal approvals	1.9%	Grants
Provide grant reports	1.9%	Grants
Track grant budgets	1.7%	Grants

Processes Undergoing Change

Not surprisingly, the processes undergoing the greatest change are management and reporting processes and this is the case in all business areas. Note that these processes were reported as requiring the most improvement. Develop budgets and track budgets and expenditures, first and third in the table, are the processes undergoing most change in the finance area. (see Table 5-7). In the student area, the recruit students and audit degree completion processes were undergoing the most change. Also, the focus appears to be on processes that impact revenue through improved recruitment and retention. Somewhat surprisingly, the only process from the grants area—the process of track grants budgets—was among the top six undergoing change. This is despite the much lower rankings given by respondents to the performance of all the grants management processes.

Transactional processes saw the least change. (See Table 5-8). Again, this stands to reason given the relatively higher levels of satisfaction that institutions achieved in the early 1990's with their first attempts at business process performance improvement. Institutions have either completed improvements of these processes and have moved to a continuous improvement mode, or the process is still too daunting to change, which presumably is the reason why so few institutions are seeking change in the research management information process.

Lastly, we calculated the mean process performance rating for each and the standard deviation of the responses (see Table 5-9). The processes are listed in descending order of their standard deviation. Our purpose was to identify processes where improvement efforts and experience differed most campus by campus. Of the 10 highest processes, five are in the student area. Interestingly, the student area that scored highest overall on business performance also had the greatest variation school by school. Management or strategic processes tended also to have the highest standard deviations.

Conversely, of the 10 processes with the lowest standard deviation three are in HR, four are in financial, and three are in the student area. Transactional or commodity processes are more likely to have lower standard deviations regardless of area.

The processes with the highest standard deviations are mostly those we placed in Quadrants 2 and 4 of our framework. These

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are processes for which the greatest resistance to change is anticipated, and they pose some professional risk for the reformers. The higher standard deviations may reflect a continuum, representing attempted change and failure on one end to attempted change with significant success on the other. Or, it may be that many institutions did not attempt to change the process because of anticipated resistance—they preferred to accept lower levels of process performance.

Table 5-7. Processes Where 7 Percent or More Institutions Are Undergoing Change

Process	Percent Change	Area
Develop budgets	9.4%	Finance
Recruit students	9.2%	Student
Track budgets and expenditures	7.9%	Finance
Audit degree completion	7.8%	Student
Track grant budgets	7.6%	Grants
Recruit employees	7.0%	HR

Table 5-8. Processes Where 3 Percent or Less of Institutions Are Undergoing Change

Process	Percent Change	Area
Maintain course catalog and schedule	3.8%	Student
Course enrollment	3.8%	Student
Manage labor distribution	3.5%	HR
Cash receipts	3.5%	Finance
Payroll disbursement	2.9%	HR
Produce payroll reports	2.8%	HR
Administer benefits	2.6%	HR
Research management information	2.4%	Grants

Table 5-9. Processes with Significant Standard Deviations

Process	N	Mean	Std. Deviation
Audit degree completion	282	2.38	0.981
Recruit students	286	2.54	0.972
Advise students	289	2.46	0.885
Manage events	282	2.23	0.878
Track budgets and expenditures	292	2.45	0.874
Purchase small-dollar items	304	2.64	0.872
Report on and analyze sources and uses of funds	269	2.25	0.857
Report on and analyze enrollment management information	283	2.34	0.849
Course enrollment	303	2.75	0.839
Prepare grant proposals	274	2.12	0.823

(Continued)

Table 5-9. Processes with Significant Standard Deviations (cont.)

Process	N	Mean	Std. Deviation
Evaluate applications	279	2.59	0.821
Admit students	291	2.62	0.811
Recruit employees	294	2.31	0.793
Report on and analyze the workforce	266	1.91	0.789
Prepare external financial statements and reports	274	2.57	0.787
Maintain course catalog and schedule	304	2.57	0.784
Report research management information	239	2.10	0.784
Develop budgets	289	2.28	0.783
Produce student bills	295	2.64	0.760
Hire staff	295	2.35	0.759
Manage positions	292	2.17	0.754
Record time and attendance	299	2.16	0.753
Report time and effort	262	2.06	0.753
Maintain grades	290	2.78	0.752
Obtain and track proposal approvals	254	2.07	0.737
Process aid applications	288	2.54	0.736
Package loans	263	2.55	0.734
Manage compensation	291	2.24	0.733
Track grant budgets	266	2.18	0.730
Process student payments	294	2.66	0.719
Purchase large-dollar items	306	2.45	0.719
Administer tuition and fees	289	2.55	0.711
Hire faculty	286	2.38	0.704
Labor distribution	249	2.33	0.704
Administer benefits	300	2.45	0.699
Provide grant reports	247	2.18	0.695
Pay invoices	290	2.53	0.692
Determine financial need	279	2.57	0.684
Verify aid application	263	2.60	0.674
Verify enrollment status	271	2.61	0.669
Create accounts	288	2.57	0.654
Cash receipts	278	2.50	0.651
Issue transcripts	292	2.74	0.649
Manage receivables	274	2.47	0.647
Produce payroll reports	282	2.57	0.645
Payroll disbursement	299	2.71	0.635
Fulfill check requests	273	2.57	0.621
Provide aid reports to lenders and agencies	248	2.56	0.608

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6

Technology and Business Process Performance

Technology is dominated by two types of people: those who understand what they do not manage, and those who manage what they do not understand.

—Putt's Law

What kinds of information technologies do institutions of higher education use to improve business process performance? Are some technologies more conducive than others for changing business performance? Have those respondents who consider their institutions to be leaders or exemplars used similar or dissimilar process improvement strategies and technologies?

This brings us back to the debate over whether IT matters. In the previous chapter we found that processes that underperform are often those for which the software development is behind. Time reporting and grants management processes are examples of areas where software is not up to the task of improving performance. However, with some notable exceptions especially in the student area, it may be administration rather than IT that doesn't matter. This is not a negative comment. Adequate or satisfactory process performance is good enough for most back-office functions, and it is a wise decision to allocate resources and attention to activities that further the core mission of the institution.

Technologies in Use

The demand to improve institutional business process performance with the aid of technology has led to the development,

Key Findings

◆ An ERP system (80.5 percent) and Web self-service (68.1 percent) were used most frequently to improve process performance by institutions that reported themselves to be leaders or exemplars.

◆ ERP systems are used most often to improve business processes for finance (34.1 percent), followed by HR (27.7 percent) and student (27.5 percent).

◆ The Web was used most often to improve student processes, followed by grants management and HR processes.

◆ Regression analysis reveals that use of the Web was the most significant technology used to improve business process performance in all business areas.

purchase, and deployment of numerous information technologies that have been used differently and with varying degrees of success. We believe that we are still at the beginning stage of adopting new technologies. In the near future, with ERP systems as a foundation, institutions will continue to add technologies such as customer relationship management, learning management systems, as well process-specific technologies and business solutions.

We asked the respondents from institutions who identified themselves as leaders or

exemplars which technologies they used most to improve business performance (see Figure 6-1). By far the most mentioned technology is ERP systems, vended or homegrown, (80.5 percent) followed by Web-based self-service capabilities (68.1 percent). Of those who identified ERP, 53.1 percent specified a mostly unmodified ERP system. Least frequently mentioned was imaging (10.1 percent). We also found that 4.2 percent of the respondents attributed no innovation to technology. Business process performance can be improved through redesign or service improvements alone or with the introduction of new technologies.

Technologies in Use by Process Area

We then examined the technologies used most to improve business performance by business area, differences were observed (see Table 6-1). Over one-third (34.1 percent) mentioned an ERP system for finance, 27.7 percent for HR, and 27.5 percent for student. Not surprisingly, the management information and analysis area relied most on business intelligence tools (29.1 percent). The Web was most often mentioned for student processes (25.2 percent). It was a close sec-

ond for grants management and HR. Note, however, that all of the technologies have been used in each area to improve process performance.

The importance of the Web for student and HR processes is likely attributable to the prominence of self-service as an improvement strategy. The significant number of highly distributed transactional processes in both of these areas lends itself to Web-enabled self-service. The significance of the Web for grants management may be attributable to both innovation driven by self-service and the use of the Web in custom-developed grant applications.

To further understand the tools used to improve business process in all areas and for each functional area, we did a regression analysis. The findings are found in Table 6-2. We scored each institution by the level of process performance reported by area and then separately for each functional area. If an institution indicated it was an exemplar for each of the 10 processes included in the finance area, they received a score of 50. At the other end of the spectrum, if they recorded themselves at risk on all 10 finance processes, they received a score of 10. With this information we ranked all institutions by the amount

**Figure 6-1.
Technologies Used to Improve Process Performance**

ECAR
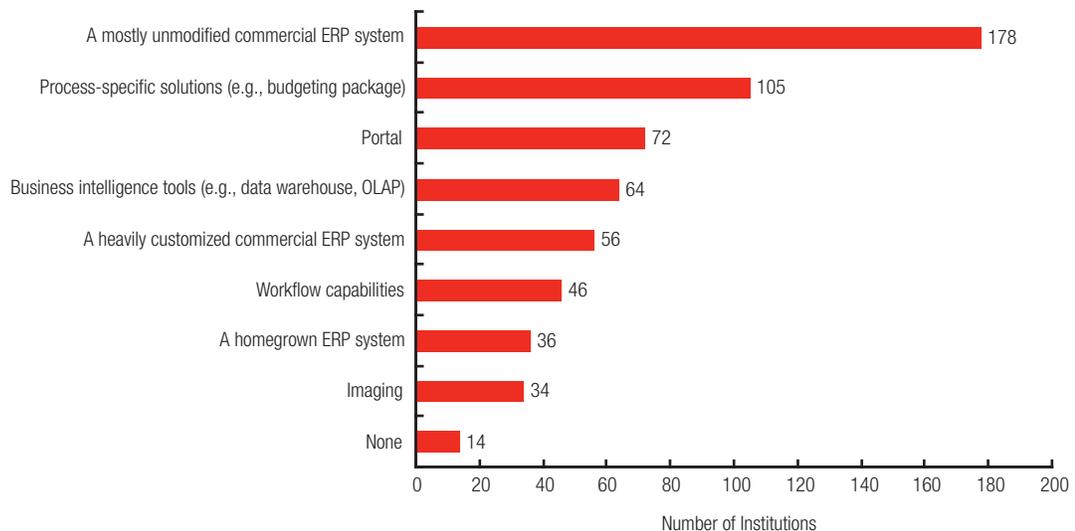
of self-reported process performance they achieved. Using their performance score as the dependent variable, we determined which, if any, technology best explained the performance score.

For overall process improvement across all areas, the most significant factor was the Web. This may be attributable to the relatively higher performance levels in the student area where Web self-service is a predominant strategy. This is also true for HR. It was also the strongest factor for each area, with the exception of grants management. Business intelligence tools made a difference for finance and management information and analysis, and ERP was also a factor for the finance area.

This doesn't mean that ERP is unimportant. Rather, the results suggest that ERP technology is a foundation technology. It has become

Table 6-1. Technologies for Improving Process Performance by Area

Technology	Finance	HR	Student	Grants	Management Information and Analysis
A mostly unmodified commercial ERP system	18.6%	13.6%	14.2%	12.9%	12.7%
A heavily customized commercial ERP system	10.3%	9.6%	7.2%	5.0%	6.7%
A homegrown ERP system	5.2%	4.5%	6.1%	6.9%	5.5%
Process-specific solutions (e.g., budgeting package)	13.4%	13.9%	11.6%	9.9%	15.2%
Business intelligence tools (e.g., data warehouse, OLAP)	16.5%	8.8%	8.0%	10.9%	29.1%
Web-based self-service capabilities	17.5%	22.7%	25.2%	23.8%	14.5%
Workflow capabilities	14.4%	12.6%	8.9%	17.8%	4.8%
Imaging	2.1%	6.4%	6.3%	5.9%	4.2%
Portal	7.2%	7.8%	12.5%	6.9%	7.3%
Total	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Table 6-2. Technologies with the Greatest Impact by Area

Functional Area	Strongest Factor	Next Factor
Finance	Web-based self-service	Business intelligence tools
Grants	None	
HR	Web-based self-service	
Student	Web-based self-service	
Management information and analysis	Web-based self-service	Business intelligence tools
All areas	Web-based self-service	

a minimum requirement or capability for most, if not all, institutions. Institutions that achieve the highest levels of process performance use more than just ERP. They combine the transaction processing power of ERP with the analytical capabilities of business intelligence tools and the self-service capabilities and user interface of the Web. And they are using these technologies to link transactions end-to-end and across departments. For over one-fifth of the survey respondents, the portal has assumed importance in this mix. Joel Hartman, vice provost for information technologies and resources at the University of Central Florida (UCF), describes the role of ERP technology this way. "The ERP system is both an enabler and a limitation to what you can achieve. It is the lubricant that makes the institutional machinery run. For users, the portal is the key component of the information architecture: it's the framework for access to information."

As we examined differences among functional areas, it appeared that some of the functional area variation had more to do with the type of process than with the functional area itself. We grouped the processes by type: management, reporting, and transaction. In Figure 6-2, we see that in all three types of processes in the finance area, ERP systems were mentioned most often overall. Business intelligence tools were significant for management functions. Not surprisingly, ERP systems, the Web, and business intelligence technologies were more significant for reporting than for management and transaction processes. And an ERP system, followed by the Web, was most significant for transaction processes.

For HR we note again the importance of an ERP system, but it was not as a great as for finance (see Figure 6-3). The Web and process-specific solutions are more important for HR than finance. Financial processes appear to be


Figure 6-2. Technologies Used for Improving Process Performance in Finance

ECAR
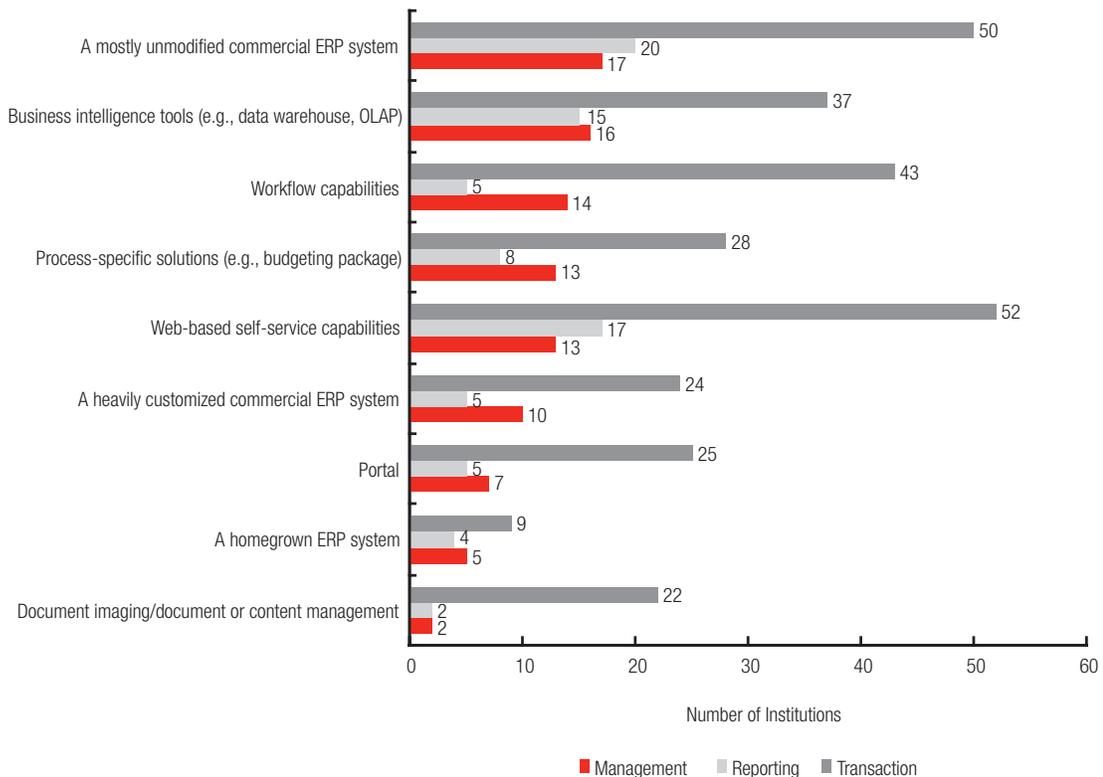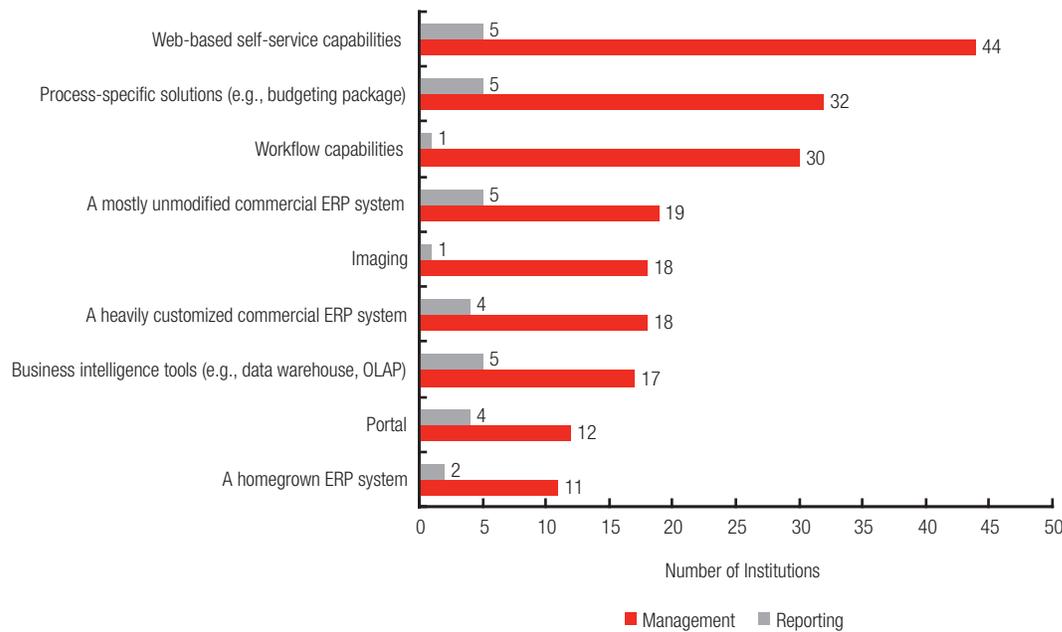
**Figure 6-3.
Technologies
Used for
Improving Process
Performance in HR**

more extensively supported by the base ERP package. This is not surprising given that the finance application is often the most mature part of a vendor's offerings. Commercial ERP packages have achieved greater capability in financial management, due in part to their relatively rule-driven processes and cross-industry comparability. The prominence of the Web and process-specific solutions for HR also makes sense. HR has several significant processes that lend themselves to Web self-service. These include benefits administration and time capture. In addition, the technology marketplace has several prominent process-specific solutions for HR processes such as time capture and resume tracking.

An ERP system and the Web dominate student services (see Figure 6-4). Our respondents viewed the Web as more important in the student area than in HR. We attribute this to a greater emphasis on self-service for students. Processes like registration, grade reporting, and bill payment have become widespread self-service processes at many institutions.

As we have noted elsewhere, there is great reliance on business intelligence tools in management information and analysis (see Figure 6-5). Joel Hartman of UCF explains how his institution is using business intelligence tools. "UCF deals with institutional problems on an institutional level and not on a departmental level. Departments run applications and the institution captures the data, which become an institutional asset. As a result, UCF is building—layer by layer—an enterprise information architecture, using data marts with a data warehouse under development) with a Web front end and OLAP capabilities."

The grants management processes were primarily management processes, which rely first on an ERP system, followed closely by the Web, and workflow capabilities. (See Figure 6-6).

Summary

The majority of respondents readily acknowledged that technology was instrumental in the high levels of process performance

**Figure 6-4.
Technologies
Used for
Improving Process
Performance in
Student Services**

Web-based self-service capabilities
181
51
193

A mostly unmodified commercial ERP system
97
35
108

Process-specific solutions (e.g., budgeting package)
76
14
106

Portal
86
22
103

Workflow capabilities
40
12
99

Business intelligence tools (e.g., data warehouse, OLAP)
48
11
98

Imaging
33
3
70

A heavily customized commercial ERP system
49
16
50

A homegrown ERP system
44
13
46

0   50   100   150   200   250

Number of Institutions

■ Management   ■ Reporting   ■ Transaction

**Figure 6-5.
Technologies
Used for
Improving Process
Performance in
Management
Information and
Analysis**

Web-based self-service capabilities
24

Workflow capabilities
18

A mostly unmodified commercial ERP system
13

Business intelligence tools (e.g., data warehouse, OLAP)
11

Process-specific solutions (e.g., budgeting package)
10

Portal
7

A homegrown ERP system
7

Imaging
6

A heavily customized commercial ERP system
5

0   5   10   15   20   25   30

Number of Institutions

ECAR

Technology	Number of Institutions
Web-based self-service capabilities	24
Workflow capabilities	18
A mostly unmodified commercial ERP system	13
Business intelligence tools (e.g., data warehouse, OLAP)	11
Process-specific solutions (e.g., budgeting package)	10
Portal	7
A homegrown ERP system	7
Imaging	6
A heavily customized commercial ERP system	5

Figure 6-6. Technologies Used for Improving Process Performance in Grants Management

achieved by their institution. The results indicate that the ERP system is important, but it is only one tool needed to achieve strong process performance. The institutions with the highest levels of performance have built upon their ERP system with Web applications and business intelligence tools to achieve higher levels of capability. This mirrors a trend seen in other industries as well

Partha Banerjee, associate director, technology advisory services, Pricewaterhouse-Coopers, describes an evolution of ERP implementations in the commercial sector. He writes, "ERP II is a strategy that extends the core ERP system and integrates it with specialized enterprise solutions such as business intelligence, customer relationship management, sales force automation, supply chain management, e-logistics, e-procurement, and product life cycle management. This would also require a shift in ERP implementation focus within an enterprise—from being an IT project to being a business activity and the end result is enterprises deriving real and tangible benefits from ERP implementation." (Banerjee, 2004) We note very similar trends in higher education.

7

Explaining Business Process Performance

We are confronted with insurmountable opportunities.
　　　　　　　　　　　　　　　　　　　　—Pogo

What distinguishes institutions that achieve high levels of business process performance from those that do not? Some speculate that it is strictly a matter of resources. Those that have more can do more. Others point to the emergence of a leader or champion for change as the most important factor. There are myriad contributing factors promoting and supporting business innovation at universities. Fourteen such factors are examined in this chapter.

Factors Contributing to Process Improvement

We asked respondents to identify up to three factors that contributed most to business innovation at their institution. We grouped their responses into one of three categories:

◆ Leadership
◆ Technology
◆ Environment, including the institution's culture

Leadership scored highest (see Figure 7-1). One hundred and sixty-one respondents (48.1 percent) indicated the importance of the president or provost, 96 (28.7 percent) mentioned department leaders, 60 (17.9 percent) noted the importance of the board of trustees, and 39 (11.6 percent) attributed

Key Findings

◆ Leadership, planning, and technology were the top three factors that respondents report contribute most to process innovation at their institution.
◆ The ability to leverage employee suggestions was the most significant factor in determining institutions' process performance.
◆ The effective use of technology followed by the ability to forge improvements across functional areas and measurement were the most important factors in differentiating process performance among institutions.
◆ Carnegie class was not a significant factor in differentiating institutions' process performance.
◆ On the whole, institutions are satisficing and not optimizing.

business process improvement to a change in leadership. One hundred and eight respondents (32.2 percent) also pointed to planning as an important factor. Planning is included in the leadership group as it is most often a leadership initiative.

Garland Elmore, associate vice president for teaching and learning information technology and dean of information technology at Indiana University, described the role of planning in improving process performance

**Figure 7-1.
Factors That Drive
Business Process
Improvement**
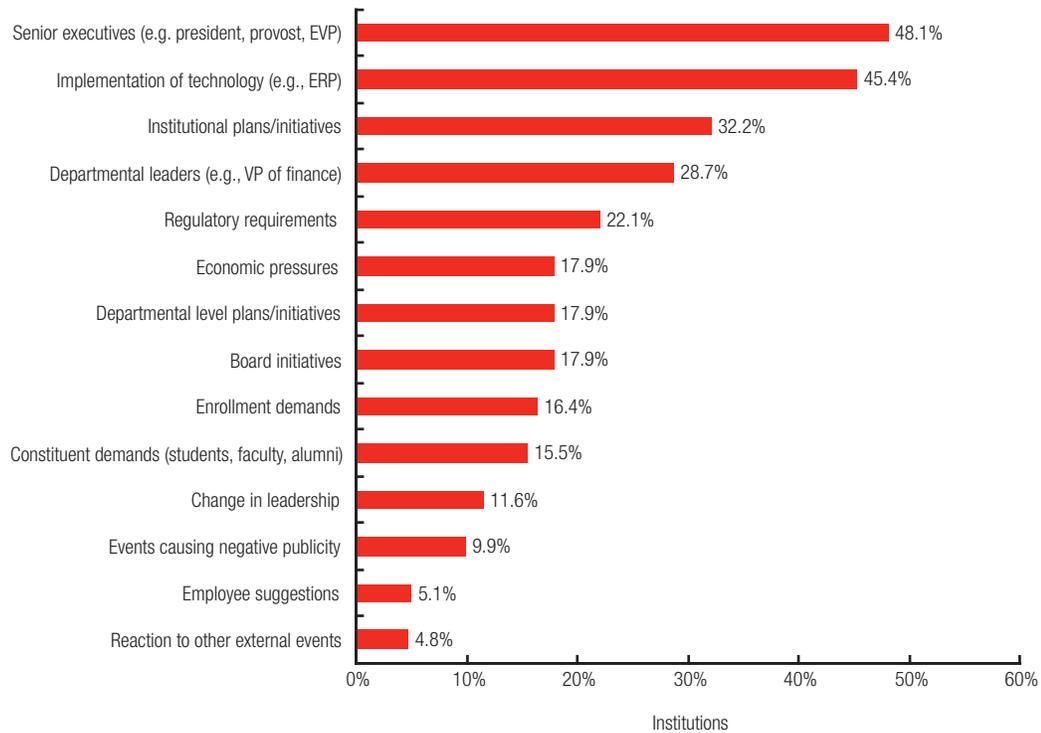
at his institution. "The origin of our business process innovation goes back to the strategic planning document. Part of the plan was to seek out grants and contracts to pay for IT as well as evaluating purchasing and other IT business processes."

Technology was next highest, with 152 respondents (45.4 percent) ranking it in the top three. For many, the purchase of an ERP system was a catalyst to improve process performance. ERP was linked to rethinking business processes, either because the new system was deliberately reviewed or rethought, or because its implementation led to or required change.

Other factors contributing to process change are environmental or contextual. These factors include regulation (74 respondents, 22.1 percent), economic pressures (60 respondents, 17.9 percent), enrollment pressures (55 respondents, 16.4 percent), constituent demands (52 respondents, 15.5 percent), negative publicity (33 respondents, 9.9 percent), and reaction to other external events (16 respondents, 4.8 percent).

Interestingly, only 17 respondents (5.1 percent) noted the importance of employee suggestions. And yet, when we did a regression analysis to determine which factors most distinguished the leading institutions in performance (see Table 7-1), the most significant factor was employee suggestions. This observation begs further investigation in future research.

According to United Kingdom management expert, Robert Heller, "Successful companies demonstrate a willingness to listen to their staff, to encourage input from the bottom up, and have a culture where ideas and innovation are taken seriously—even if they do not work out…One entrepreneur I know suggests that whenever someone comes up with an idea, he personally goes and thanks them, and if it's not going to work, explains why." (Paton, 2004)

Building a culture that values and builds upon employee suggestions is in evidence at the University of California, San Diego. Elazar Harel, assistant vice chancellor for administrative computing and telecommunications

Table 7-1. Factors Contributing to Process Improvement by Area

Functional Area	Strongest Factor	Next Factor	Third Factor
Finance	Employee suggestions		
Grants	Employee suggestions		
HR	Senior executives	Employee suggestions	
Student	None		
Management information and analysis	Institutional plans	Employee suggestions	Board initiatives
All areas	Employee suggestions		

explained, "Every year there is an one-day showcase of technology, mostly for staff, but faculty attend too. We introduce them to new technologies and processes at UCSD. There are 60 to 70 booths in a large exhibit hall and about 90 presentations. We try to have departmental users, not IT staff, give the presentations in order to convey to the audience a real user experience. About 2,000 people attend each year, including about 100 from other institutions."

Institutions pursue varied approaches to soliciting employee suggestions. Donald E. Harris, vice provost for information technology and CIO at Emory University, describes their approach. "I don't think there is anything magical about it. We take everything in the toolbox and use it in ways that are appropriate for the situation: targeted surveys to specific user groups, brainstorming-oriented focus groups, feedback from Web sites, and input from group discussions using our collaborative software."

Others pursue a highly formalized process of soliciting input and incorporating it into decision making. Theresa Rowe, assistant vice president of Oakland University explains the particulars of her institution. "We have a formal employee suggestion program where we constantly encourage everyone to submit his or her ideas on our Web site. A committee representing all aspects of

the institution meets every other week to review the ideas. The committee members have participated in Lean Principles training to help us evaluate the suggestions and determine how the suggestions can streamline departmental operations."

The critical factor is that employees are encouraged to think about change and are empowered to speak up, but we found that how that input is solicited is unimportant. This underscores the importance of an internal cultural environment that supports and reinforces employee input. Internal culture and technology appear to go hand-in-hand as enablers of improvement in all industries. In fact, a February 2005 (Accenture, 2005) survey of 150 senior executives at Fortune 1000 companies found that 84 percent identified a culture that better accommodates change and 74 percent identified a more robust IT infrastructure as two capabilities that would enable them to address their business challenges. Higher education appears to also require both of these factors to drive successful process improvement.

The HR, student, and management information and analysis areas did not factor in employee suggestions. For HR, leadership was the most important. Though there is no obvious explanation for this, it may be linked to earlier observations that HR is often lower on institutional improvement agendas than

other areas. Also, it may be that change to an HR process not initiated by a senior executive has a difficult time being implemented.

For management information and analysis, institutional planning was most important, followed by board initiatives. This stands to reason, as institutional planning is typically a strategic initiative, which depends upon more sophisticated management information. The importance of board initiatives is likely related to demand for greater accountability. In many cases, accountability initiatives mandate the utilization of enhanced performance metrics, which are data intensive.

Institutional Characteristics

To further understand what contributes to business process improvement, we asked a series of scaled questions about the institution. Included were the importance of leadership, institutional culture, technology, institutional goals, and incentives (see Table 7-2). We calculated the mean and standard deviation for each characteristic based on a scale of 5 (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, and 5=strongly agree). The higher the mean, the higher the respondents' agreement with the importance of the characteristic rated. Scoring highest were leadership characteristics, followed by IT, culture, and incentives.

We also looked at Carnegie class, institutional control (public and private institutions), and enrollments. We would note that none of these explained much in the way of business process performance. Respondents from doctoral institutions rate these characteristics more highly, but not significantly. Each Carnegie class, public and private institutions, and each enrollment size group had a rich spectrum of high-performance, modest-performance, and low-performance institutions.

We also looked at whether the institutional environment was stable, dynamic, turbulent,

or unstable. Unlike other ECAR studies where this factor distinguished among institutions, it had little significance with respect to business process performance.

Four scaled questions addressed leadership characteristics including planning and organization (see Table 7-3). As a group these had the highest means with stable senior leadership scoring highest (3.94). As one would expect, the demonstrable support of leaders that are empowered to make changes is important for pursuing improvement. Wayne Mohr, assistant vice president of technology, Bloomsburg University of Pennsylvania, explains, "The leadership of the institution must be engaged and encourage appropriate action and attitudes toward improvement projects. The functional leaders must then suspend their disbelief and do the best they can."

The actions of individual leaders were not the only important factor. The leadership structure also plays a role. A centralized decision-making structure that empowers leaders to make decisions about process improvements was also a critical factor. Similarly, the presence of an institutional strategic plan that focuses attention and resources on creating high performing administrative processes was also important.

IT and IT services scored next highest (see Table 7-4). The scaled questions for IT included questions regarding the institution's propensity to use technology to improve business processes and the role of the IT organization in facilitating process improvement. Respondents believed that positioning the IT organization to assist with process improvement projects was important to achieving higher levels of process performance. Similarly, respondents reported that institutions that most effectively utilize technology in business processes also achieve higher levels of performance. These, of course, are reinforcing characteristics. One

Table 7-2. Institutional Characteristics and Performance

Institutional Characteristic	Mean	Std. Deviation
Stable senior leadership	3.94	1.035
Strategic plan calls for high performance in our administrative processes	3.70	1.053
Business units in my organization often ask for IT's assistance in using technology to improve their processes	3.62	1.013
Achieved process improvements that cross traditional functional boundaries	3.37	1.035
Effectively uses technology to achieve high business process performance	3.36	1.054
Look externally for ideas to improve the performance of our administrative business processes	3.34	0.955
Senior leaders act as champions of business process change	3.29	1.058
Actively learns from failures	3.27	0.906
Highly centralized decision-making structure	3.22	1.163
Administrative process improvement occurs frequently at my institution	3.01	1.048
Process improvement at my institution is driven primarily by grassroots (employee) ideas	2.96	0.982
Administrative process improvement occurs throughout my institution	2.86	1.027
Rewards individuals who improve process performance	2.81	0.972
Leadership has a high tolerance for risk	2.76	0.967
Rewards departments that improve the processes under their control	2.67	0.939
Regularly measures the effectiveness of its business processes	2.64	1.015
Made a significant commitment to one or more formal process improvement methodologies	2.23	1.066

Table 7-3. Impact of Leadership on Process Improvement

Institutional Characteristic	Mean	Std. Deviation
Stable senior leadership	3.94	1.035
Strategic plan calls for high performance in our administrative processes	3.70	1.053
Senior leaders act as champions of business process change	3.29	1.058
Highly centralized decision-making structure	3.22	1.163

Table 7-4. Impact of IT on Process Performance

Institutional Characteristic	Mean	Std. Deviation
Business units in my organization often ask for IT's assistance in using technology to improve their processes	3.62	1.013
Effectively uses technology to achieve high business process performance	3.36	1.054

would assume that an institution at which the IT organization is a trusted partner in performance improvement efforts would also be more effective at leveraging technology's ability to improve processes.

Donald Harris describes how at Emory University IT serves as a facilitator of process improvement. "I don't think IT should be pushing redesign issues alone. Rather we should be engaged in a partnership with our business and academic leaders. Because we know business processes, as well as integration issues, we have much to offer in this area. Our role is often to keep challenging the way we do business as a university, and how we might work more effectively and efficiently with information systems. Having partners at the senior management level who share this agenda with you is critical to really making progress toward change."

Cultural factors (see Table 7-5) had the third highest set of means with the most important being improvements that cross functional boundaries (3.37) followed by looking externally for ideas (3.34) and learning from failures (3.27). Measurement scored low (2.64) reaffirming what we have learned from previous ECAR studies: Higher education institutions are not good at measurement. And the lowest mean was found for formal process improvement methodologies such as TQM and Six Sigma.

These results suggest that improvement methodologies are only tools and do not in and of themselves guarantee results. Many institutions have spent considerable time and resources on benchmarking studies, TQM or BPR training, and similar improvement meth-

ods. These results seem to suggest that these approaches are much less of a factor in determining high performance than are leadership, technology, environment, and culture.

Lastly, the lowest set of means was found for incentives, all of which were below neutral or a mean of 3.00 (see Table 7-6). Clearly, business innovators do not feel rewarded formally for their efforts. However, even the ability to provide small rewards or recognition is helpful. Elazar Harel notes that UCSD uses a suggestion box. A small committee reviews suggestions for implementation. If UCSD acts on the suggestion, a prize is awarded and the employee's picture is posted on the portal.

Differentiating Among Institutions

After establishing the relative importance of institutional characteristics, we proceeded to determine which, if any, differentiated performance among institutions on the process performance spectrum (see Table 7-7). We performed this analysis across all functional areas and within each functional area.

We found that most important is the effective use of technology, the ability to forge improvements across traditional functional areas, and measurement. In the case of grants management, measurement was important and it was the second-most important factor for HR and finance. In the area of finance and grants management, it was important that leadership have a high tolerance for risk. So while leadership factors scored the highest means, in a regression, cultural factors and IT better differentiate among high performing institutions.

ECAR

Table 7-5. Impact of Institutional Culture on Process Improvement

Institutional Characteristic	Mean	Std. Deviation
Achieved process improvements that cross traditional functional boundaries	3.37	1.035
Look externally for ideas to improve the performance of our administrative business processes	3.34	0.955
Actively learns from failures	3.27	0.906
Administrative process improvement occurs frequently at my institution	3.01	1.048
Process improvement at my institution is driven primarily by grass roots (employee) ideas	2.96	0.982
Administrative process improvement occurs throughout my institution	2.86	1.027
Leadership has a high tolerance for risk	2.76	0.967
Regularly measures the effectiveness of its business processes	2.64	1.015
Made a significant commitment to one or more formal process improvement methodologies	2.23	1.066

Table 7-6. Impact of Rewards and Incentives

Institutional Characteristic	Mean	Std. Deviation
Rewards individuals who improve process performance	2.81	0.972
Rewards departments that improve the processes under their control	2.67	0.939

Table 7-7. Factors That Differentiate Performance at Institutions

Functional Area	Strongest Factor	Next Factor	Third Factor
Finance	Effectively uses technology	Regularly measures business processes	Leadership has a high tolerance for risk
Grants	Regularly measures business processes	Uses formal process improvement methodologies	Leadership has a high tolerance for risk
HR	Effectively uses technology	Regularly measures business processes	
Student	Effectively uses technology	Ask for IT's assistance in using technology	
Management information and analysis	Effectively uses technology	Regularly measures business processes	
All areas	Effectively uses technology	Improvements cross traditional functional boundaries	Regularly measures business processes

Barriers to Improvement

Conversely, we also assessed barriers to process performance (see Figure 7-2). Funding typically scores highest and this study is no different with 189 (56.4 percent) ranking it equal to the cultural factor resistance to change. Wayne Mohr of Bloomsburg University of Pennsylvania noted, "People's general resistance to change is a barrier. That has to be dealt with individually, highlighting the fact that the train is coming—people in a changing organization either get on the train, or get run over."

Another significant and obvious barrier is the institution's having other priorities, as reported by 145 respondents (43.3 percent). Interestingly, technology was only seen as a barrier by 8 respondents (2.4 percent). Earlier we noted that some respondents had perceived a lack of alignment between IT and some HR business processes, and that is found anew in a regression analysis done on barriers (see Table 7-8).

In a regression analysis, the factors that stand out across the board and for all areas are diminishing returns and lack of alignment of technology and business processes. Diminishing returns is clearly a satisficing decision. And this may confirm why so many respondents cluster in the middle of a normal curve ranging from being at risk to exemplars indicating a level of satisfaction with a majority of the business processes at their institutions (see findings in Chapter 4).

Having presented a view of the present state of higher education and business process performance, we now turn to the future.

Figure 7-2. Barriers to Improving Process Performance
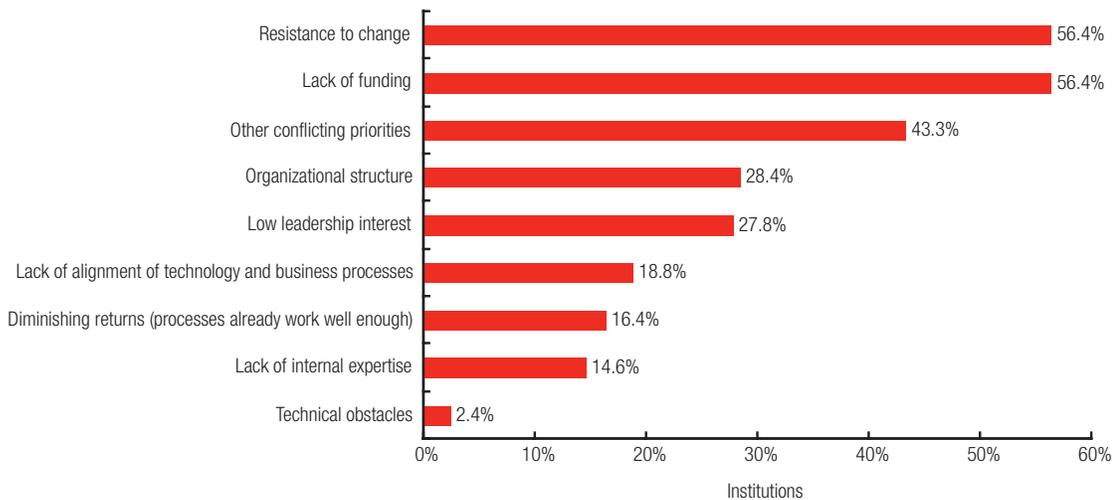
Table 7-8. **Factors Explaining Process Performance**

Functional Area	Strongest Factor	Next Factor	Third Factor
Finance	Diminishing returns		
Grants	Diminishing returns		
HR	Diminishing returns	Lack of alignment: technology/business processes	Lack of internal expertise
Student	Diminishing returns	Lack of alignment: technology/business processes	
Management information and analysis	Diminishing returns		
All areas	Diminishing returns		

ECAR

8
Examining the Future of Business Process Performance

There may come a time when "good enough" simply isn't.
—Richard N. Katz

So far, this study has examined the ways in which colleges and universities approach administrative business processes and how they use technology to support those processes. This chapter examines the approaches and technologies institutions have adopted to improve business process performance, and then discusses some emerging cross-industry trends and how these may impact future efforts to improve process performance in higher education.

Today's Approaches

An organization can undertake business process improvement to achieve a number of different results. These include, but are not limited to, the results described in Table 8-1.

In this study, we learned that on the whole, higher education organizations have not optimized their administrative business processes. Most institutions that responded to our survey indicated an acceptable, but not exemplary, level of performance. In many cases, the decision to settle on good enough is a rational decision, as some processes do not, by their nature, require above-average performance. However, many institutions have not optimized important processes, and numerous institutions ranked some of their

administrative processes as at risk. Only 16 percent of respondents indicated diminishing returns, meaning that processes work well enough and efforts at improvement were not worth the expenditure. This suggests further that institutions still have significant room for improvement.

This doesn't mean that colleges and universities have ignored process performance. Many institutions have been through one or more waves of business process reengineering; total quality management, Six Sigma, or other process improvement initiative. Others have taken a technology-driven approach, choosing to use the implementation of a new technology, such as an ERP system, to instigate process change. These initiatives have yielded mixed results. Process improvement programs can render encouraging results, but when implemented without accompanying technology improvements, these results can be difficult to sustain. A technology-based approach can introduce an overwhelming degree of change to the organization, and it can be expensive and time-consuming. As we learned in ECAR's study of ERP implementations, (Kvavik et al., 2002) many organizations experienced a loss of productivity for up to a year after the system was introduced, as staff slowly adapted

Table 8-1. Results of Business Process Improvement

Desired Result	Definition	Example
Efficiency	Doing the same thing cheaper or faster	Reducing the time to process a financial aid application
Effectiveness	Doing the same thing better, introducing higher quality or higher value	Reducing the number of errors during financial aid processing
Risk avoidance	Reducing risk to the institution, such as through better management information or better controls	Reducing financial exposure by tightly integrating budget and financial systems
Customer satisfaction	Doing things that make students, faculty, staff, and other constituents happier with institutional services	Introducing self-service capabilities for common student and employee transactions
Cost avoidance	Doing things that allow the institution to avoid future expenditures	Designing processes to scale without the need to add employees, often through the use of technology
New capabilities	Adding new services that were not available before the improvement	Allowing a student to handle any student services transaction at any student-facing office, rather than having to go to multiple places

to the change introduced. Even when such an approach succeeds, it can be difficult to introduce additional change later without significant time and expense.

Some institutions have implemented alternative organizational models with good result. One such model is shared services, in which a single center is established to service multiple customers. Shared services can be deployed internally in a large, complex organization, or they can be set up to cross organizational boundaries, allowing multiple organizations to share resources, costs, and benefits. Examples of internal shared services organizations include one-stop student services centers, which colocate and cross-train student services departments (such as the offices of the bursar, registrar, and financial aid) to provide high-quality customer service, often with improved efficiency. Such centers are in place at many institutions today, and are often supported by self-service, ERP, and customer relationship management (CRM) technologies.

Another common target of shared services, both internally and externally, is the IT function. A case study written in conjunction with the ECAR ERP study profiled several shared approaches to implementing ERP. (Caruso and King, 2002) One case study investigated the well-known common management systems project run by the California State University system for its 23 campuses, an internal shared-service function that provides hosting and shared management of the university's PeopleSoft applications. (Caruso and King, 2002) Another ECAR case study written in conjunction with the outsourcing study, profiled the Associated Colleges of Central Kansas (ACCK), a consortium created by six small colleges in 1966 (Hassett and Kancheva, 2002) to share the cost of developing IT services. IT shared services functions, whether internal or external, provide a number of benefits to their member organizations, including reduced costs, introduction of new capabilities, risk avoidance, and increased effectiveness. As a part of this study, specific

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process improvement endeavors at Iowa State University and The City University of New York have been written about in depth in separate case studies.

Shared services can be one effective way to reduce costs, lessen risk, and provide services that might be unattainable by an individual department or institution. This approach is not without challenges. First and foremost is that in order to implement a shared services model, consensus must be reached on the business model and processes that will be used, as well as the financial model, the supporting technologies, and the staffing. And once the shared service has been implemented, strong governance is necessary to keep it operating effectively. The consensus nature of shared services does not lend itself to agile business performance, because it is difficult for one member to request changes without impacting—perhaps negatively—the utility of the service for other members. As this study reveals, business processes that invoke broad political engagement and low strategic impact tend to not be great candidates for reform.

Another strategy available to institutions is business process outsourcing (BPO). In this approach, selected business functions are turned over to an external provider to manage, either to provide a cost advantage or because the provider has greater expertise in managing that function than the institution. Higher education has traditionally used BPO in selected areas such as food services, facilities management, and bookstores, areas in which such companies as Aramark, UNICCO, and Barnes & Noble have been enlisted to manage these processes on campuses around the country.

However, higher education has traditionally been reluctant to outsource its administrative processes. Even in areas like payroll, where many businesses have outsourced to providers like ADP, many colleges and universities (partly due to the complexity of faculty compensa-

tion) continue to manage their own payroll functions. If higher education chooses to follow the trends begun in other industries, functions such as call center management, benefits administration, and financial aid processing may be turned over to outside providers. The University of California, for example, recently hired a private firm to manage retirement plan account administration. But this approach is not without risk. In today's environment, it is difficult to seamlessly incorporate such external services into an institution's operations, and difficulties resulting from systems integration and unaligned processes can degrade customer service.

Higher education has also introduced a number of administrative technologies in an effort to improve the performance of business processes. The most significant of these is ERP systems. Implementing ERP systems provided significant benefits to many, although not all, colleges and universities. ERP systems, provide a common repository for administrative data; speed the processing of transactions; allow the distribution of tasks to individual employees, and allow integration of data across multiple parts of the organization. ERP systems (or homegrown systems with similar functionality) serve as the foundation of today's administrative organizations in higher education. However, ERP systems are in some ways limiting. At installation, they allow flexibility in configuration, but once in place, making changes is a difficult and expensive proposition. Similarly, customizing ERP systems to conform to an institution's business processes generates significant expense both during the implementation and over the ongoing life cycle of the product, causing many organizations to conform their processes to the way the software works. Also, ERP systems are, at their core, transaction processing systems, and higher education, for the most part, is not a transaction-driven business.

Many institutions have realized that while ERP systems are a useful foundation, the value is not in the transaction itself, but in the information provided by the transaction. These institutions have deployed a variety of analytical environments, including data warehouses; reporting packages; and online analytical processing (OLAP) tools to provide their users with the ability to better understand their business. These tools can provide valuable information, and can be used for a range of purposes from better transactional reporting, to analytics, to identification of at-risk students. But they too have issues. Many reporting, modeling, and decision-support tools are difficult for non-IT staff to use. And, there is often a time lag before information from the institution's transactional systems makes it into the data warehouse or OLAP environment, limiting the usefulness and capabilities of these tools for real-time management of the institution.

Higher education has been moving forward with process and technology changes that have resulted in increased efficiency, enhanced effectiveness, better customer service, and other benefits to institutions. However, as reported by our respondents, these efforts have not resulted in optimized processes at most institutions. And the target continues to move, even as these efforts continue.

The Changing Environment

Historically, higher education has operated in a slowly changing environment. The core pillars of teaching and research upon which the institutions were built have not departed far from their foundation, even as over the years other industries have undergone rapid and considerable change. Because of its relatively stable and insulated nature, higher education has been able to make steady, incremental improvements in administrative processes, but it has been spared the relent-

less pressure to change faced by organizations in other sectors. That situation, however, is beginning to change.

First, many segments of higher education have—despite very challenging times—been protected from revenue pressure by favorable demographics (the pipeline) and the preeminence of U.S. colleges and universities as "exporters" of higher education. By 2013, demographers forecast the high school graduation of the last class of "echo boomers" and it is evident that declining demand and rising visa restrictions are diminishing the number of foreign students wishing to study in the U.S. The changing enrollment dynamics will increase competition to enroll students intelligent enough to complete postsecondary education, and wealthy enough to pay for it.

Another factor driving institutional change since 2001 is cost pressure. Institutions often react to short-term cost pressures with tools like hiring freezes and budget reductions, but such fixes are not sustainable over the long-term. Some institutions require real, systemic redesign to emerge intact from this sustained downturn. Even once the economy improves, cost pressures may persist. Tuition growth has outpaced inflation for a number of years, and if prospective students balk at fees, institutions may be forced to further reduce costs. What's needed is for institutions to find ways to sustain growth and implement necessary changes while keeping costs down.

Further exacerbating the situation are two relatively new factors driving change: customer demands and increased competition. Incoming students at many institutions are no longer the traditional 18-year-old, full time learner. They may be older, have full time jobs and families to juggle, and have different motivations and needs for their education. Additionally, student expectations for the level of service provided by an institution is influenced by what other businesses like banks and on-line retailers provide, such as 24x7, location-

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independent, customized services. Additionally, many institutions are facing increased competition for students, from for-profit universities focused on business and technical disciplines. Both the changing demands of prospective students and increasing choice among educational providers, may pressure colleges and universities to make significant changes to remain competitive.

But what is most likely to force sweeping changes in higher education is not customers or the economy, but the government. While higher education has adjusted to some regulatory changes in the past few years such as the Student and Exchange Visitor Information System (SEVIS), it has so far been spared the full brunt of regulatory change. However, increased focus on rising costs and accountability could put higher education into legislators' crosshairs, and it can prompt introduction of Sarbanes-Oxley-like legislation that could radically alter the way colleges and universities manage their administrative processes. The impact of such legislation could be tremendous. According to AMR Research, companies will spend close to $15.5 billion on compliance-related activities in 2005, including $6.1 billion on Sarbanes-Oxley alone. AMR estimates total spending on compliance-related activities will be $80 billion over the next five years. (Marlin, 2005) Given the difficulty in making even minor process changes in existing systems, complying with such regulation could be extremely arduous for many institutions.

A New Alternative

In the ECAR study of IT alignment in higher education, we discussed at length the emerging business model known as the "adaptive organization." (Albrecht et al., 2004) In this model, an organization is redesigned to respond rapidly to environmental changes. Organizational structures, business processes, and technology are built that can in a plug-and-play fashion, quickly change to meet business needs. This approach helps an organization to continuously tune its processes to business needs and customer demands. However, to be that flexible an organization must be able to quickly alter how it does business, from both a process and technical perspective. Few higher education institutions, with business processes structured around ERP systems, have this degree of flexibility.

However, an emerging solution, known as the business process management system (BPMS) promises to bridge the gap between the relatively inflexible world of traditional ERP and legacy systems, and provide the responsiveness required to achieve the benefits of the adaptive organization while also delivering a host of process improvement capabilities.

Just what is a business process management system? The answer to that question is still evolving. The BPMS is a new type of technology solution designed for the easy creation, operation, and modification of a process-driven business. Forrester Research (Harris, with Vollmer, Lawrie, Allen, 2003) defines business process management as "event-driven integration driven by orchestrated, application-oriented workflow across multiple internal applications and/or between trading partners." Giga Information Group (Vollmer, Leaver, Moore & Peyret, 2004) defines it as "the designing, executing, and optimizing of cross-functional business processes that incorporate systems, processes, and people." BPM software vendor Lombardi Software (Lombardi Software) defines it as "the understanding, visibility, and continuous improvement of business processes. BPM is about delivering improved business performance to easily automate processes, measure their impact, and upgrade them in response to new ideas or external business events." Gartner (Sinur, 2005) defines it as "a general term for the services and tools that support explicit process management (for example,

process analysis, definition, execution, monitoring, and administration), including support for human and application-level interaction. One key differentiator between workflow and BPM is the application-level interaction."

Sound confusing? It is. In an attempt to analyze the BPMS market, META Group found over 140 vendors selling BPMS-like products. To make matters more perplexing, major consulting firms and industry associations present BPM as a management discipline enabled by the BPMS system.

At its heart, BPM is a concept of managing an organization through a process, rather than a functional orientation, and it is about extracting optimal performance out of those processes. This is hardly a new idea. For years management pundits and business schools have been espousing the merits of a process-oriented management approach. But, actually achieving true process oriented management can be difficult. It is no easy task to acquire the real-time data needed to effectively manage processes, and changing processes in response to the data is time-consuming and difficult when business processes are embedded in transaction processing systems.

The intriguing aspects of BPMS, and the features that differentiate them from other systems such as workflow, enterprise application integration (EAI), and process modeling tools, is that BPMS systems:

◆ Abstract the business process out of the application and run it at a higher level inside the BPMS

◆ Have a standards-based way of describing and executing a business process, so the business process is portable across enterprise boundaries and will work across different technology platforms (BearingPoint, Inc.)

In essence, the BPMS system is a middleware layer that allows an organization's business processes to be modeled using a standard language. The system can be used to execute and monitor the business process, utilizing existing systems such as ERP to complete transactions, and manual processes such as the interaction between a call center representative and a customer. The BPMS system can be used to integrate processes across areas of an enterprise that do not share common systems, while ensuring repeatability. It can also be used to share processes across organizations, enabling easier connection with customers and suppliers.

"The idea is to build a process tier above your existing systems," says author and BPM expert Peter Fingar. (Haapaniemi, 2005) "That's where you play the game of creating and modifying business processes." With many of today's BPMS technologies, says Fingar, "you can manage the entire life cycle of a process—from the discovery of process, where you are analyzing how your company currently works, to the design or modification of new processes, to implementing or enacting that process, to getting feedback from that process so you can optimize it."

Each BPMS vendor has a different approach, but the common benefits of the BPMS concept include:

◆ *Process abstraction.* By using the BPMS as the "trusted source" for business processes in the organization, these processes can be stored and executed independently of application software, and can reach across disparate systems and incorporate both human and system-driven tasks. This allows rapid modification of business processes, without the need to customize or reconfigure underlying applications. It also allows organizations to design processes that best meet their needs, rather than having to conform to a process model dictated by a software vendor.

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◆ *Enforcing process rules:* By serving as the engine that drives the organization's business processes, BPMS standardizes the processes and ensures adherence to the processes. This can greatly ease regulatory compliance issues, since all processes are inherently documented and executed consistently, and can increase an organization's efficiency and effectiveness while reducing risk.

◆ *Real-time measurement.* Most BPMS systems also include the capability to monitor process performance in real-time. By providing management with dashboard views of their organization's processes, BPMS systems can help identify problems as they occur and trigger responses, and can also be used to identify areas for further improvement.

◆ *Process modeling.* Many BPMS systems allow managers to run models of their processes under different scenarios, such as increased workload; smaller employee base; or modified process. By understanding the performance of the process under these different conditions, managers can experiment to find optimal settings and run what-if scenarios that can assist with future planning.

◆ *Continuous improvement.* BPMS systems provide the mechanism to support true continuous improvement initiatives. By helping managers identify issues and providing the means to rapidly update the processes within the system, organizations can continually make adjustments to optimize the performance of their business processes. These improvements are sustainable, since they are integrated into the organization's core systems.

◆ *Sharing process components.* Because BPMS systems model business processes according to set standards, organizations can share process components, both internally and externally. This allows for the

development of best practices libraries; deployment of common processes across large organizations; and process-level integration with external entities such as customers and suppliers.

◆ *Leveraging existing investments.* BPMS systems act as a middleware layer to connect other systems in a structured way. They can be installed in conjunction with an organization's ERP systems, CRM systems, business intelligence systems, or other existing technologies. They increase the flexibility and responsiveness of these systems, while leveraging them to perform the functions for which they are designed.

◆ *Flexible implementation.* An organization can choose to deploy a BPMS in just one or two high-volume processes where the capabilities are most needed, or the BPMS can be deployed as the operational foundation of the organization. A BPMS can also be implemented incrementally, moving one process at a time across the organization.

While stand-alone BPMS systems are relatively new to the market, the benefits achieved by their customers are generating a strong interest in these products. In one example, "a major financial institution was able to reduce the amount of time required to develop new products for its wholesale customers from an average of 28 days to less than five minutes. This was accomplished using BPM technology that orchestrated the required steps in the operation, enabling parallel processing of tasks when feasible and minimizing the delays caused by multiple human interactions through the implementation of workflow features that managed the escalation of decision making when needed." (Vollmer et al., 2004)

BPMS systems can help organizations achieve many of the qualities of an adaptive enterprise. By allowing business processes to

be changed, both in systems and in practice without requiring large IT initiatives, organizations can rapidly modify their processes to meet shifting business conditions and improve process performance. One BPMS customer "has deployed seven major end-to-end processes with over 500 subprocesses. They release new processes every quarter, and continue to evolve their existing deployments every six to eight weeks."(Lombardi Software) This flexibility would not be possible with traditional applications.

Another important way that BPMS helps improve process performance is by providing real-time monitoring of key performance indicators (KPIs). KPIs can be built into the process models created in the BPMS, and then they can be tracked as processes are executed. By monitoring these KPIs, management gets an accurate view of how processes are performing, and is able to reallocate resources as needed to optimize performance. Since processes can easily be changed, this approach allows organizations to quickly "sense and respond," another key tenet of the adaptive organization.

Also important to the adaptive organization is the ability to plug-and-play different organizational, process, and technology components as needed to scale operations to meet demand. One example is the use of outsourced call center representatives to supplement internal staff at peak times. As discussed earlier in this chapter, in a traditional model one pitfall of this approach is that the lack of integration between the organization and the outsourcer will become apparent to the customer, resulting in poor customer satisfaction. The BPMS has the capability to overcome this barrier. By providing the outsourcer's employees direct access to the organization's customer service processes, both procedures and systems, the outsourcer is seamlessly integrated into the organization's process, which means they can easily ramp up or down as needed. If desired, the outsourcer's own systems could be incorporated into the process, allowing the organization to leverage their provider's best practices into their own process.

The BPMS can also enhance the delivery of shared services. It could be used to allow organizations to come together and leverage expensive components such as ERP systems, while retaining ownership and execution of their own unique business processes. Conversely, the BPMS could be used to allow organizations with disparate information systems to create shared functional service centers that execute a common business process while continuing to use each organization's own back-end systems.

As the BPMS market evolves, the benefits and shortcomings of BPM systems will become more apparent, and their role in the overall architecture of the enterprise will become clearer. For organizations that are early adopters of such systems, success will be dependent upon the same factors critical in any systems implementation: having strong sponsorship; having a clear idea of the business problem being solved; addressing the people, process, and technology aspects of the implementation; and performing effective project and change management.

BPM and Higher Education

While BPM systems offer tremendous promise, they have not, to the best of our knowledge, yet been deployed in a higher education environment. However, the new paradigm they represent does have the potential to address some of the key issues raised in this and other ECAR studies. These include:

◆ *Improved ability to react to change.* The BPMS gives the organization the ability to quickly and cost-effectively react to change, whether instigated by government regulation, changing business

needs, or the desire to become more adaptive in doing business. By disassociating the business processes from the transactional systems, the processes can be changed as needed without the time and expense of major systems modifications or upgrades.

◆ *Maintaining satisfactory process performance.* As we learned in this study, higher education's approach to business process performance is one of satisficing, or creating processes that are good enough without being exemplary. However, process performance is not a static target. As regulations, the business environment, and constituent demands change, institutions that do not continue to improve their processes may see their processes fall back into at-risk status. BPM systems provide process owners within institutions the necessary information and tools to improve their processes continuously and in a way that can be sustained, without the need for expensive system customizations. They also enable the institution's management to monitor process performance in real-time, allowing intervention in poorly performing processes before the institution is at significant risk.

◆ *Lower maintenance costs.* As we discovered in the ECAR study of IT funding (Goldstein, 2004), higher education IT organizations are spending most of their budgets on maintenance activities, leaving few resources to focus on value-added activities like business process improvement. BPM systems promise to allow business owners to directly control the changes made to the organization's processes, workflow, and monitoring capabilities. At minimum, this gives process owners new capabilities without requiring significant IT support. In some organizations, particularly those that have customized their ERP applications, the savings in IT can be substantial if these maintenance activities are reduced in scope.

◆ *Allow competitive advantage at reasonable cost.* As we learned in the ECAR ERP study (Kvavik et al., 2002) 87 percent of institutions had a strategy of implementing their enterprise systems with as few customizations as possible. While this approach helped to reduce implementation and maintenance costs, the downside was that institutions adopted a generic business process that did not differentiate the institution significantly from its competitors. By removing the linkage between the transaction system and business processes, institutions can selectively choose to implement customized business processes where they feel uniqueness makes sense, allowing them to better serve their constituents or better differentiate themselves to prospective students and faculty. For those processes that are considered to be commodities, institutions can take advantage of the common modeling language of the BPMS to share processes among one another, purchase them from vendors, or outsource them to an external provider.

Business process management systems, while not a panacea, appear to offer some significant benefits that make them worthy of evaluation by higher education institutions. These systems have the potential to allow institutions to leverage their existing applications, identify and implement significant process improvements, and change the way business processes are managed. And because they can be implemented incrementally, institutions interested in exploring their capabilities can do so in a controlled, low-risk way. Will we see a push toward a Wal-Mart level of efficiency in higher education? Probably not anytime soon, but these new tools provide new capabilities for institutions to make the right level of process

improvement for them, in ways not easily possible before.

As institutions look to the future and evaluate how to approach business process performance, the lessons learned from this study suggest a three-pronged approach:

1) Identify and remediate processes that are at risk. These processes do not need to move to an exemplary level, but they do need to reach a satisfactory level of performance.
2) For commodity processes—those that need to be performed but do not dif-ferentiate the institution—the focus will likely be on satisficing or providing good enough rather than exemplary levels of service, efficiency, or effectiveness.
3) For processes that can differentiate the institution, especially in student-centric areas, institutions will be more likely to push to create high-performing pro-cesses. The BPMS tools discussed above could help institutions interested in op-timizing their performance achieve new levels of efficiency, effectiveness, and customer service.

Appendix A

Institutional Respondents to the Online Survey

American University
Amherst College
Anne Arundel Community College
Aquinas College
Arizona State University
Auburn University
Baldwin-Wallace College
Ball State University
Bates College
Baylor College of Medicine
Baylor University
Bemidji State University
Berry College
Bethel University
Blinn College
Bloomfield College
Bloomsburg University of Pennsylvania
Boise State University
Brandeis University
Brazosport College
Brenau University
Bridgewater State College
Brigham Young University
Brown University
Caldwell College
California Lutheran University
California Maritime Academy
California Polytechnic State University,
    San Luis Obispo

California State University, Bakersfield
California State University, Channel Islands
California State University, Chico
California State University, Dominguez Hills
California State University, Fresno
California State University, Fullerton
California State University, Hayward
California State University, Long Beach
California State University, Los Angeles
California State University, Monterey Bay
California State University, Northridge
California State University, Office of
    the Chancellor
California State University, Sacramento
California State University, San Bernardino
California State University, San Marcos
California State University, Stanislaus
Calvin College
Camden County College
Canisius College
Catawba College
Cecil Community College
Central Michigan University
Charles R. Drew University of Medicine
    & Science
Charleston Southern University
Chesapeake College
Cincinnati State College
City University of New York

Claremont McKenna College
Cleveland Institute of Art
Colby-Sawyer College
Colgate University
College Misericordia
College of Saint Benedict/Saint John's
    University
College of Saint Catherine
College of the Holy Cross
Colorado State University
Columbia State Community College
Columbus State University
Coppin State University
Cornell University
Creighton University
Crown College
Dakota Wesleyan University
Dalhousie University
Davenport University
Delta State University
Denison University
DePaul University
DePauw University
Dickinson College
Dine College
Dominican University
Drexel University
East Stroudsburg University of Pennsylvania
Eastern Iowa Community College District
Eastern Michigan University
Eastern Oregon University
Edison College
Elmhurst College
Elon University
Emory University
Emporia State University
Estrella Mountain Community College
Fairfield University
Fashion Institute of Technology
Florida Atlantic University
Florida Memorial College
Fordham University
Franklin and Marshall College
Franklin Pierce College
Franklin W. Olin College of Engineering

Gallaudet University
George Fox University
George Mason University
Georgetown University
Georgia College & State University
Georgia State University
Georgian Court College
Glendale Community College
Graduate Theological Union
Grand Valley State University
Guilford College
Hamilton College
Harford Community College
Herbert H. Lehman College/CUNY
Hollins University
Holy Family University
Hudson County Community College
Hudson Valley Community College
Humboldt State University
Illinois Wesleyan University
Immaculata University
Indiana Higher Education
    Telecommunication System
Indiana University
Indiana University East
Indiana University Kokomo
Indiana University Northwest
Indiana University of Pennsylvania
Indiana University Southeast
Indiana University-Purdue University
    Indianapolis
Iowa Lakes Community College
Iowa State University
Judson College
Juniata College
Kansas State University
Kaplan Higher Education Corporation
Kenyon College
La Sierra University
Lake Michigan College
Landmark College
Lanier Technical College
Leeward Community College
Le Moyne College
Lesley University

Lewis & Clark College
Linn-Benton Community College
Longwood University
Louisiana State University
Loyola Marymount University
Loyola University Chicago
Lyon College
Manhattan College
Mansfield University of Pennsylvania
Maricopa Community College District
Marietta College
Marist College
Mary Baldwin College
Marygrove College
McGill University
Medical University of South Carolina
Mercy College
Mercyhurst College
Metropolitan Community College
MGH Institute of Health Professions
Miami Dade College
Miami University
Michigan State University
Middle Tennessee State University
Middlebury College
Millsaps College
MiraCosta College
Monmouth College
Montana State University–Bozeman
Montgomery College Central Administration
Montgomery County Community College
Moravian College
Mount Aloysius College
Mount Mary College
Naropa University
Nipissing University
North Carolina School of the Arts
North Central Texas College
North Harris Montgomery Community
    College District
Northeastern University
Northern Arizona University
Northern Michigan University
Northwestern College
Northwestern Michigan College

Oakland University
Oberlin College
Ohio Northern University
Oregon Health & Science University
Oregon State University
Pennsylvania College of Technology
Pepperdine University
Plymouth State University
Pomona College
Presbyterian College
Princeton University
Purdue University
Raritan Valley Community College
Red Deer College
Regis University
Rensselaer Polytechnic Institute
Rhode Island College
Ringling School of Art and Design
Roberts Wesleyan College
Rowan University
Rutgers, The State University of New Jersey,
    New Brunswick
Saint Anselm College
Saint Joseph's College, New York
Saint Louis University
Saint Mary's University of Minnesota
Salisbury University
Salve Regina University
Sam Houston State University
Samford University
San Francisco State University
San Jose State University
Seattle Pacific University
Sewanee: The University of the South
Shepherd University
Sinclair Community College
Sonoma State University
Southern Methodist University
Southern Oregon University
Southwestern University
St. Cloud State University
St. Lawrence University
St. Olaf College
St. John's University
State Fair Community College

Stephen F. Austin State University
SUNY College at Geneseo
SUNY College of Optometry
Sweet Briar College
Temple University
Texas A&M University at Galveston
Texas Christian University
Texas State University
Texas Wesleyan University
The College of New Jersey
The College of Saint Scholastica
The Evergreen State College
The George Washington University
The Michener Institute for Applied
    Health Sciences
The Ohio State University,
    Mansfield Campus
The University of British Columbia
The University of Memphis
The University of Tennessee Health Science
    Center
The University of Toledo
Trinity University
Tufts University
UCLA
Universidad Carlos Albizu
University and Community College System
    of Nevada
University at Albany, SUNY
University of Akron
University of Alabama at Birmingham
University of Alaska
University of Alaska, Fairbanks
University of Calgary
University of California, Berkeley
University of California, Irvine
University of California, Merced
University of California, San Diego
University of California, Santa Barbara
University of California, Santa Cruz
University of Central Florida
University of Colorado at Boulder
University of Dayton
University of Delaware
University of Denver

University of Hawaii
University of Idaho
University of Illinois at Springfield
University of Kansas
University of Louisville
University of Maine at Presque Isle
University of Manitoba
University of Mary Washington
University of Massachusetts Central Office
University of Miami
University of Minnesota Duluth
University of Missouri System
University of Montana–Western
University of Nebraska
University of Nebraska at Kearney
University of Nevada, Las Vegas
University of New Mexico
University of North Carolina at Charlotte
University of North Dakota
University of Oklahoma
University of Oregon
University of Saint Francis
University of South Carolina
University of South Florida
University of Southern Mississippi
University of St. Thomas
University of Texas at Arlington
University of Texas at San Antonio
University of Texas Medical Branch
University of Utah
University of Washington
University of West Florida
University of Wisconsin Colleges
University of Wisconsin–Eau Claire
University of Wisconsin–Madison
University of Wisconsin–Milwaukee
University of Wisconsin–Platteville
University of Wisconsin–River Falls
University of Wisconsin–Stout
University System of Georgia Board
    of Regents
University System of New Hampshire
Valparaiso University
Vancouver Community College
Vassar College

Vermont State Colleges

Villa Julie College

Virginia Tech

Washington State University

Washington University in St. Louis

Weber State University

Wesleyan University

West Virginia University

Western Carolina University

Western Kentucky University

Western New Mexico University

Western Washington University

Westfield State College

Widener University

Willamette University

William Woods University

Winona State University

York College of Pennsylvania

York College/CUNY

Appendix B

Interviewees in Qualitative Research

Bloomsburg University of Pennsylvania
Wayne Mohr, Assistant Vice President, Technology, Information and Communication

Brooklyn College
Mark Gold, Director of Information Technology Services

California State University, San Marcos
Wayne A. Veres, Dean and Chief Information Officer, Instructional and Information Technology Services

Cincinnati State Technical and Community College
Mark Cain, Chief Information Officer

College of Saint Benedict/Saint John's University
Jim Koenig, Director of Information Technology Services

College of Saint Catherine
Alfred M. Dees, Director, Computing Services

Coppin State University
Ahmed El-Haggan, Vice President of Information Technology Chief Information Officer, and Professor of Computer Science

Drexel University
John Bielec, Vice President of Information Resources and Technology, and Chief Information Officer

Elon University

Chris Fulkerson, Assistant Vice President for Technology

Susan Klopman, Dean of Admissions and Financial Planning

Emory University

Donald E. Harris, Vice Provost for Information Technology and Chief Information Officer

Florida Atlantic University

Jeffrey Schilit, Associate Provost and Chief Information Officer, Information Resource Management

Franklin W. Olin College of Engineering

Joanne Kossuth, Chief Information Officer

Humboldt University

William C. Cannon, Director, Information Technology Services

Indiana University-Purdue University Indianapolis

Garland C. Elmore, Associate Vice President for Teaching and Learning Information Technology, Dean of Information Technology, and Associate Professor of Communication

Iowa State University

Maury Hope, Director, Administrative Technology Services

Margaret S. (Johnny) Pickett, Associate Vice President for Business and Finance/Controller

Kansas State University

Elizabeth A. Unger, Vice Provost for Academic Services and Technology and Dean of Continuing Education

Millsaps College

Tom Henderson, College Librarian

Oakland University

Theresa Rowe, Assistant Vice President, University Technology Services

Texas Wesleyan University

S. W. Hollingsworth, Chief Information Officer

The City University of New York

Michael Ribaudo, University Dean for Instructional Technology and Information Services

The University of Hawaii System

David Lassner, Chief Information Officer

ECAR

UCLA

Kathleen O'Kane, Associate Director of Undergraduate Admissions and Student Systems Manager

The University of British Columbia

Richard Spencer, Executive Director, IT Strategy, Information Technology

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Appendix C

Glossary

Higher Education Business Process Definitions

Major Process: Financial Management
Subprocess

1. Develop budgets—Annual process to create, analyze, and approve departmental, college, and institutional budgets.
2. Create accounts—Regular process to request, approve, and create accounts and account budgets (including restricted accounts).
3. Track budgets and expenditures—Ongoing process of the budget account owner to monitor projected budgets against actual expenditures and charges.
4. Prepare external financial statements and reports—Process to prepare all external financial reports to state agencies, lenders, and the public including audited financial statements.
5. Purchase small-dollar items—Process to request, approve, and purchase routine goods and services.
6. Purchase large-dollar items—Process to request, approve, and purchase specialized or high-dollar value goods and services.
7. Pay invoices—Process to record, verify, and pay invoices from all external vendors.
8. Fulfill check requests—Process to request, approve, and produce a check for payments not involving invoices (e.g., honoraria).
9. Cash receipts—Process to accept and record payments for items such as gifts, auxiliary enterprises, and third-party billings (excludes student accounts receivables).

Major Process: Human Resources
Subprocess

1. Recruit employees—Process to post or advertise a job, solicit applications, and identify a qualified applicant pool.
2. Hire faculty—Process to prepare and approve faculty contracts for full-time and adjunct faculty.

3. Hire staff—Process to prepare, approve, and extend an offer of employment to a full or part-time staff member including the position salary, title, and reporting relationship.
4. Manage compensation—Annual process to propose, analyze, and implement compensation levels for different job classifications.
5. Manage positions—Process to request a new position or a modification to an existing position including compensation, title, job duties, and skill requirements.
6. Administer benefits—Process for employees to annually enroll in benefits programs, monitor their selections, and report changes due to life events.
7. Manage labor distribution—Process to designate and maintain which budget account(s) will fund a faculty or staff member's compensation costs.
8. Record time and attendance—Process to track, approve, and input daily hours worked for nonexempt staff.
9. Issue pay checks—Process to calculate withholdings and net pay and to disburse regular payroll.
10. Produce payroll reports (including tax reports)—Process to produce all year-end reports to employees and the federal government.

Major Process: Student Services
Subprocess: Admissions
1. Recruit students—Process to identify prospective students, maintain communications with them, and to encourage their application to the institution.
2. Manage events—Process to develop invitations, track attendance, and evaluate the effectiveness of admissions events.
3. Evaluate applications—Process to acknowledge receipt of the application (all or parts), convey status to the applicant, and to perform all necessary evaluations of the applicants credentials.
4. Admit Students—Process to make and communicate the acceptance/rejection decision.

Subprocess: Student Accounts
1. Administer tuition and fees—Process to propose, establish, and implement the tuition and fee structure for courses that will be used to generate the student bill.
2. Produce student bills—Process to calculate all student charges (tuition and fees) and create and communicate invoice to the student.
3. Process payments—Regular process to receive and post a payment to the student account. Includes the administration of payment plans.
4. Manage receivables—Ongoing process to monitor outstanding receivables and to take successive measures to collect past-due balances.

Subprocess: Financial Aid
1. Process aid applications—Obtain from students all institutional and federal applications for aid, including required supporting documents.
2. Determine need—Review of family financial status and eligibility for scholarships, grants, and loans.
3. Verification—Verify student/family financial data.

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4. Package loans—Prepare and disburse federal and institutional loans, obtain required signatures on promissory notes and other loan documents.
5. Produce reports to lenders and federal agencies, auditors—Prepare and produce all required status reports to external entities.

Subprocess: Records and Registration

1. Maintain course catalog and schedule—Process to determine which courses and sections will be offered, assign instructors, meeting times, and rooms.
2. Plan academic careers/advise students—Process for advising students or providing them with tools to plan their own academic careers including selecting majors, determining course requirements, and analyzing the impact on aid eligibility and time to graduation.
3. Process student course enrollments—Process for students to select courses, obtain any necessary approvals, verify prerequisites, and enroll students in courses (include add/drop process).
4. Audit degree completion—Process to analyze students' progress towards their degrees, determine eligibility for graduation, and identify students with unsatisfactory progress.
5. Maintain grades—Process to collect, verify, and post grades from instructors to the student transcript.
6. Verify enrollment status—Process to verify and report a student's enrollment status and academic progress.
7. Issue transcripts—Process to request, produce, and issue official transcripts.

Major Process: Grants Management
Subprocess

1. Prepare grant proposals—Process to develop all of the nonscience aspects of grant proposals including the proposal budget.
2. Obtain and track proposal approvals—Process to perform all necessary internal reviews of proposal, provide authorized approvals, and ready the proposal for submission.
3. Track grant budgets—Ongoing process to approve grant expenditures and monitor the budget to actual performance.
4. Report time and effort—Process to record, approve, and report the time charged by faculty and staff to a grant budget.
5. Provide grant reports to agencies—Prepare, approve, and submit all required progress and final reports to granting agencies regarding the use of grant funds.

Major Process: Management Information and Analysis
Subprocesses

1. Analyze sources and uses of funds—Create capabilities for end users to understand the sources and uses of their financial data. Includes the ability to report on activity costs and financial contribution of individual programs.
2. Analyze workforce—Ability to provide information to decision makers to analyze the composition of the workforce (faculty and staff) including staff skills, time to retirement, and diversity. Among other things it allows decision makers to spot growing gaps in skill sets, analyze the impact of pending retirements, and to review trends in hiring and retention.

3. Enrollment management—Enables the institution to research where its students are coming from and why they come. Informs decisions about investments in recruiting strategies, retention strategies, and the marketing of the institution.

4   Research management—Information and tools to enable decision makers to monitor trends in research activity; evaluate the backlog of proposals and awards; and monitor success rates by organization unit, discipline, and investigator.

Appendix D

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