Benchmarking Procurement Practices in Higher Education

Supply Chain Management Series
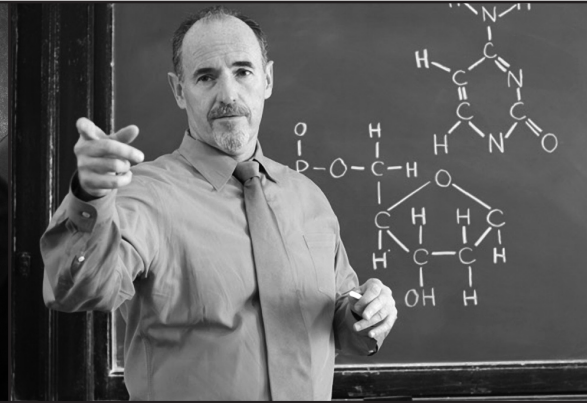
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F O R E W O R D

On behalf of the IBM Center for The Business of Government, we are pleased to present this report, "Benchmarking Procurement Practices in Higher Education," by Richard R. Young, Kusumal Ruamsook, and Susan B. Purdum.

Universities and colleges are facing increasing financial pressures due to a combination of decreasing student enrollments and reduced operating budgets. To respond to these financial challenges, many colleges and universities have resorted to tuition increases. Others have focused on examining their business processes, including the procurement function, in order to reduce their institution's operating expenses.

Albert Morales

This report focuses on the procurement function within higher education. Since universities are spending billions of dollars on a range of goods and services, it seemed prudent to conduct a benchmarking study of procurement practices across a broad range of colleges and universities. This study seeks to uncover leading practices that colleges and universities across the nation, as well as other nonprofit organizations, may consider adopting as they wrestle with common financial challenges. This benchmarking study reflects the efforts of a unique collaborative partnership between the IBM Center for The Business of Government, the IBM Public Sector Procurement Consulting Practice, SciQuest, and the Penn State Center for Supply Chain Research.

Eric Niemann

Universities and colleges have only recently begun to apply strategic focus to the procurement function over the last five to 10 years. This report captures some of the initial spend management techniques that a number of early adopter schools have implemented to better control their institutional spend. It will provide both a benchmark and a source of ideas about specific procurement practices that a college or university may consider adopting in the future.

We hope this study becomes a useful resource for college business officers and college procurement directors across the nation.

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E X E C U T I V E   S U M M A R Y

Today many, if not most, colleges and universities are becoming caught in a financial bind. For public institutions, state legislatures are increasingly reluctant to boost annual subsidies, and many are actually reducing amounts historically allocated to higher education. Private and public institutions alike have come to the realization that the double-digit tuition hikes of recent years have likely reached their end and the area to now investigate is the spending side of the equation. Improving procurement practices may be the most compelling area of spend.

In any given year, universities are spending billions of dollars on a range of goods and services necessary for the ongoing support of their educational and research missions. Thus, it is critical that these institutions look at improving both the efficiency and effectiveness of their procurement practices. The term *efficiency* relates to increasing the value obtained from each dollar of expenditure. While improvements may be found in securing lower costs for the goods and services bought, they may also be achieved by reducing the internal administrative costs of the transaction. The term *effectiveness* suggests that procurement processes must be responsive, flexible, and adaptable for their university constituents. Moreover, the procurement function is effective when viewed in the context of supply chain management. University procurement organizations must adopt supply chain management thinking and practices—supplier relationship management, supply segmentation, technology and e-procurement adoption, strategic sourcing, order management, and performance measurement, to name a few—in order to be effective.

This report chronicles the output of a research endeavor undertaken via a three-way partnership consisting of SciQuest, Inc., a leading provider of e-procurement software solutions; IBM's Public

Sector Procurement Consulting Practice; and Penn State's Center for Supply Chain Research. The research analyzed procurement activities, policies, and procedures of eight leading North American colleges and universities. SciQuest provided access to the schools through its Innovators' Circle, a group of early adopter higher education institutions who banded together to share best practices and benchmarking data. IBM provided its expertise in questionnaire design and data collection along with funding for the project. Finally, Penn State provided its expertise in consortium benchmarking processes and analysis.

The methodology employed is known as consortium benchmarking. It is primarily a qualitative approach that largely resembles eight in-depth case studies from which cross-organizational contrasts and comparisons are made. The intent is to gain an understanding of an issue and to determine those key variables that could lend themselves to subsequent research using other methodologies such as surveys. While the relative performance of the participating schools may be labeled "leading" and "laggard," it is noted that all are very capable organizations employing innovative approaches to the procurement process. Although this benchmarking research used a questionnaire, it is not to infer that this is survey research.

Lastly, the identities of the participating schools are not disclosed. The eight participants of this study include public and private institutions of varying sizes. Some have a substantial research emphasis, including medical schools. Locations also varied and included urban, suburban, and rural campus locations.

The first objective of the research is to measure and evaluate how colleges and universities conduct

Key Findings

1. **Spend Analysis:** Improved spend analysis will advance university procurement practices.

   - Approximately 25 percent of total operating budgets at universities are spent on procuring goods and services. This percentage may be greater for universities that engage in extensive outsourcing. Outsourcing services has the effect of increasing purchase expenditures while decreasing university payroll amounts.

   - Participating universities are not exploiting the use of spend analysis to drive value.

2. **Purchasing Strategies:** University procurement organizations are beginning to engage in strategic supplier relationships.

   - University procurement organizations are beginning to engage in strategic supplier initiatives. As an example, the study shows a trend toward leveraging spend with fewer suppliers while cultivating closer relationships with these suppliers.

3. **Purchasing Organization:** Leading university procurement organizations are reducing transaction gate-keeping; user-focused, cross-functional procurement management continues to evolve.

   - Leading university procurement organizations are moving away from being administrative gatekeepers and toward facilitators of user-centered processes. Electronic catalogs and online processes have been major driving forces in this regard.

   - The participating universities are utilizing cross-functional teams in the purchasing decision. As an example, the study shows a trend toward cross-unit collaboration in developing purchasing policies.

   - Ironically, of the participating schools, procurement experience and training do not appear to correlate to success within a procurement organization. The leading organizations appear to be those with fewer years of procurement experience (on average), less training in negotiation techniques, and fewer employees with professional certifications.

4. **Purchasing Process:** E-procurement investment is improving efficiencies, thus freeing resources to address effectiveness.

   - The participating universities are investing in enabling technologies for efficiency improvement, particularly in e-transaction processing. As organizations become more efficient, personnel resources can dedicate more time and effort on the strategic procurement initiatives for the school.

5. **Purchasing Policy:** Comprehensive purchasing policies are well documented.

   - The participating universities have in place a documented comprehensive policy that establishes guidelines and sets strategic direction for both the purchasing function and the rest of the enterprise.

6. **Performance Measurement:** Measurement criteria for suppliers and procurement management do not appear sufficiently synchronized.

   - Within performance measurement, measurement criteria for suppliers and procurement do not appear sufficiently synchronized. Customer-facing, or user-facing, metrics do not appear to be as ubiquitous as first assumed.

expenditures and to identify trends in procurement—within and across the schools. The activities of interest have been delimited to indirect spends. (Capital construction projects represent a different type of procurement process and supplier relationship altogether.) Indirect spend has an industrial equivalent of maintenance, repair, and operating (MRO) supplies and related services.

A second objective is to assess leading or best practices employed by these schools as well as their rates of adoption. While we view higher education as a specific type of industry, we find it useful to compare these best practices to those deployed in the commercial world. Thus, we devote the first section of this report to an understanding of procurement practices in leading-edge organizations.

Understanding Procurement Practices of Best-in-Class Organizations

Industrial organizations on average spend nearly half of every dollar (of revenue) earned on external goods and services (Minahan 2004). Given this level of spend, the influence of procurement on corporate competitiveness cannot be understated. To illustrate, the Hackett Study on the procurement practices of more than 300 companies reported 133 percent greater return on investment in procurement generated by world-class organizations than that generated by average companies (Quinn 2005). This superior procurement performance translates into spend savings of $3.6 million for every $1 million in procurement operation costs (Quinn 2005).

The Procurement Cycle

A generic procurement cycle encompasses pre-transactional, transactional, and post-transactional activities that are performed to acquire goods and services. Figure 1 delineates activities associated with the three phases of the procurement cycle. In the *pre-transaction phase*, the buyer determines the need, prepares the specifications, identifies suppliers (and subsequently rationalizes some), and institutes some strategic sourcing initiatives. In the *transaction phase*, the low value-added functions are performed, including preparing requisitions, placing orders, receiving goods, and paying supplier invoices. Lastly, in the *post-transaction phase*, the buyer will perform a process assessment—probably the most significant element of the cycle—and seek customer (requisitioner) satisfaction. After such assessment, some means of inventory control takes place corresponding to the assessed lead-time performance and customer demand requirements.
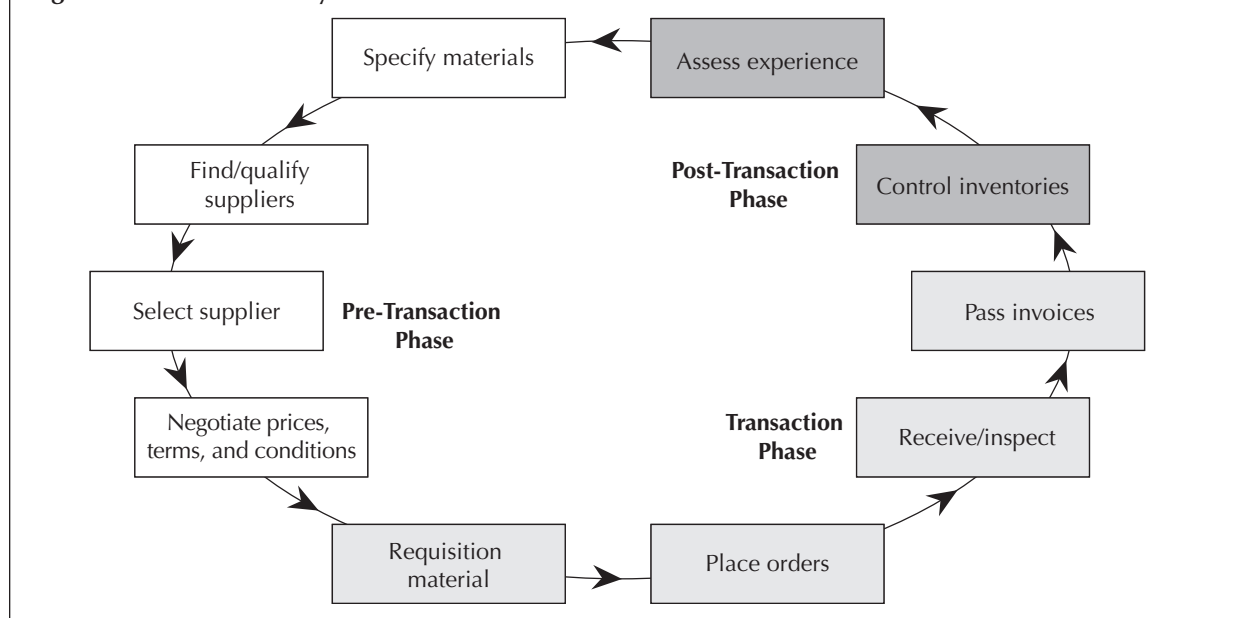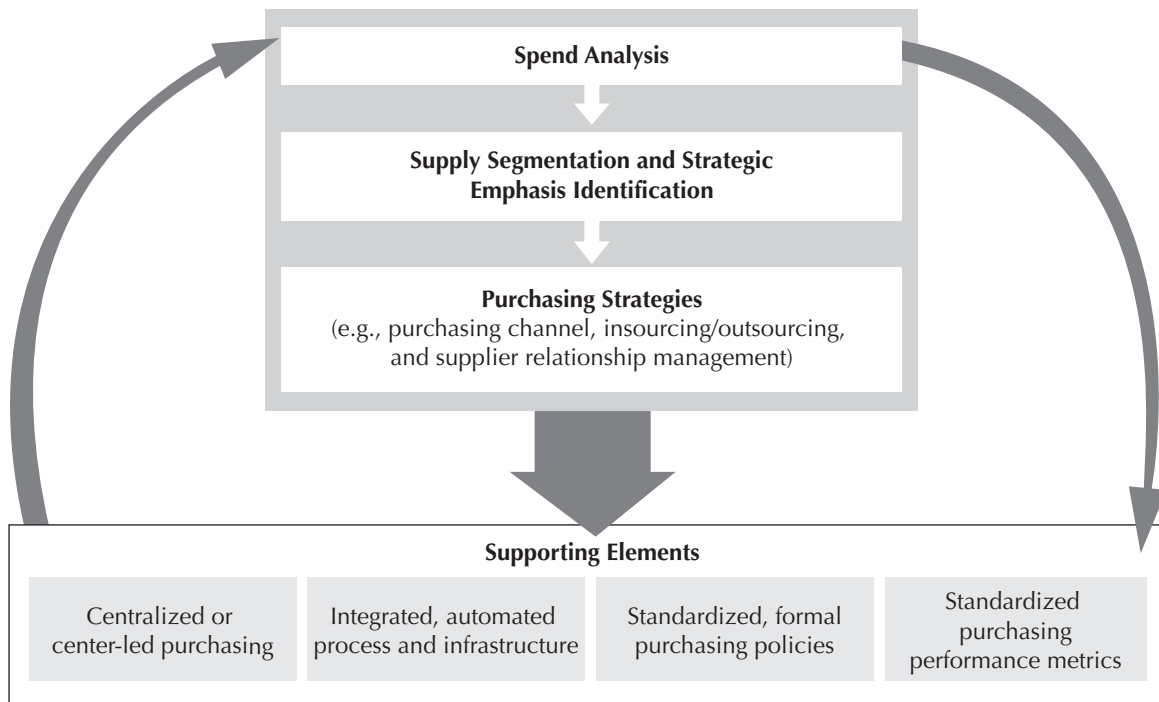
Figure 1: Procurement Cycle

Figure 2: Procurement Management Framework for Best-in-Class Organizations

Spend Analysis

Supply Segmentation and Strategic
Emphasis Identification

Purchasing Strategies
(e.g., purchasing channel, insourcing/outsourcing,
and supplier relationship management)

Supporting Elements

Centralized or center-led purchasing	Integrated, automated process and infrastructure	Standardized, formal purchasing policies	Standardized purchasing performance metrics

Savings gradually increase as the transformation process matures (Moody 2005). Newly transformed organizations can easily achieve one to two percent in annual savings simply by employing a few basics in procurement such as spend consolidation (Moody 2005). On the other hand, by tackling savings opportunities on a commodity-by-commodity basis, more mature organizations—the majority of North American organizations—are able to obtain savings beyond gains made in spend consolidation (Moody 2005). Best-in-class organizations in supply management such as Hewlett-Packard, Dell, and IBM distinguish themselves from others by their innovative systems, superior supply management leadership, and well-integrated tools (Moody 2005). These best-in-class organizations not only shed unnecessary costs from their supply management operations, but also reap procurement strategic contributions to market share, revenue, and profitability (Moody 2005).

Although leading-edge organizations arrive at advanced levels in procurement management via different avenues, one key lesson from transformation is clear: To achieve excellence in procurement management, one must approach it from multiple fronts. There are certain key elements of effective procurement management that are common among these organizations. Furthermore, progress made in

one of these elements oftentimes brings improvement in another. Figure 2 depicts a multifaceted procurement management framework for best-in-class procurement organizations.

In essence, best-in-class procurement organizations focus, in detail, on their spend management and visibility through ongoing, rigorous spend analysis. Spend analysis provides organizations the means to identify hidden potential savings and gauge procurement capabilities. Spend visibility, made possible via detailed spend analysis, helps organizations segment their supply lines (based on value) and assess supply risk associated with different purchases. Segmentation, in turn, gives organizations the ability to align procurement strategies around a particular purchased service or commodity.

Though spend analysis is a driving force of efficient procurement management, it is by no means a stand-alone process. Best-in-class organizations also deploy systems, structure, and performance metrics as supporting elements for procurement management. These supporting elements not only facilitate efficient spend analysis, but also help procurement organizations be effective and stay focused on strategic issues. Current practices associated with each element within the framework are elaborated next.

Spend Analysis

Perhaps the very first step toward excellence in procurement management is to understand, in detail, an organization's spend and supply characteristics (Minahan 2004). Spend analysis (and spend visibility) is the process of collecting and categorizing detailed expenditure data in order to learn how much is spent, by whom, and with which suppliers (Makhija 2006). Such knowledge plays a critical role in uncovering cost-reduction opportunities (Makhija 2006; Nelson, Moody, and Stegner 2005), and assessing the organization's capabilities in managing procurement (Nelson et al. 2005). Performed regularly—at least once per quarter (Nelson et al. 2005)—spend analysis will yield a plethora of data. As examples, through spend analysis a firm can monitor ongoing costs, observe the nature of demand of both internal and external customers (Makhija 2006), assess contract compliance, and track supplier performance (Elliff 2005).

Organizations that excel in spend analysis share certain similarities in their practices. First, these organizations have the capability of capturing vast amounts of data—in several cases, 100 percent of total corporate spend (Porter, Carbone, Avery, and Hannon 2004; Rudzki, Smock, Katzorke, and Stewart 2005). These firms can gather, consolidate, manipulate, and analyze procurement information obtained from all management systems such as accounts payable, enterprise resource planning (ERP), e-procurement, purchasing card (P-card), individual contracts or release paperwork, and suppliers (Makhija 2006; Nelson et al. 2005). They automate the spend analysis processes—data capture, cleansing, and analysis—in order to minimize costly, labor-intensive work (Makhija 2006; Nelson et al. 2005; Porter et al. 2004). Some firms are able to continuously capture savings on all purchases. This is quite challenging since this requirement requires a standardized and centrally integrated data repository (Nelson et al. 2005).

Finally, organizations that excel in spend analysis are all quite adept at managing their supply base. That is, compared to average organizations, best-in-class organizations have a larger percentage of suppliers electronically enabled. These firms exploit technology and automation to manage their supply base. They are also disciplined in monitoring

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Acronyms and Abbreviations

BI	business intelligence
C.P.M.	Certified Purchasing Manager
ERP	enterprise resource planning
IHE	Institutions of Higher Education
ISM	Institute for Supply Management
MRO	maintenance, repair, and operating
P-card	purchasing card
R&D	research and development
T&E/EAM	travel and entertainment/expense account management

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the proliferation of suppliers—a smaller percentage of their supply base (compared to average firms) accounts for 80 percent of total spend (Minahan 2005).

Supply Segmentation and Procurement Strategies

After conducting spend analysis, best-in-class organizations segment different lines of supply into two areas: (1) value, often determined by the amount of annual dollars spent and value-adding potential; and (2) supply risks associated with each purchase, often determined by the number of capable suppliers and fluctuation in the supply markets (Carter 1999; Sain, Owens, and Hill 2004). Experts insist that 100 percent of the external spend of an organization be covered by written commodity plans (Moody 2005; Rudzki et al. 2005). The written plans lay out, at minimum, basic data on each commodity, including market trends, total spend, pricing, technology issues, and forecast requirements (Moody 2005). Furthermore, best-in-class organizations will develop strategies for each supply segment, also referred to as commodity strategies.

There are two basic procurement strategies commonly deployed by leading-edge organizations. These are *rationalization* and *consolidation*. Both are often applied simultaneously to the supplier base, spending volume, and purchase specifications.

Rationalization is a disciplined approach to analyzing and eliminating unnecessary product specifications and varieties that offer marginal value to the process or product but contribute to product and service proliferation over time. In fact, simplifying or rationalizing the purchased product and service list is a long-term solution that has immediate payback (Nelson et al. 2005).

Rationalization can also be applied to the supply base. Best-in-class organizations are diligent in supply rationalization in two ways: (1) having the right number and mix of suppliers; and (2) continually focusing on consolidating a larger portion of spend with fewer suppliers (Minahan 2005). Compared to average organizations, best-in-class organizations do a better job with supply rationalization—a smaller percentage of their supply base represents 80 percent of total spend (Minahan 2005).

Supply rationalization is a never-ending process since, over the long term, procurement organizations are constantly battling shifting demand and market dynamics (Minahan 2005). Even so, studies consistently report that purchasing groups that strategically rationalize their supply base reap many benefits in procurement management. These groups are able to maximize spending and negotiation leverage while gaining in-depth spend intelligence of the supply market. Additionally, while working with suppliers on rationalization (e.g., jointly identifying non-value-added activities and opportunities for improvement), a collaborative relationship between the buyer and supplier often results (Nelson et al. 2005; Minahan 2005).

In Institutions of Higher Education (IHE), rationalizing the supply base can be more challenging than in the business sector. Academic institutions tend to have a less disciplined approach to managing vendors and are more tolerant of their buyers' preferences for vendors than are most business companies (Warger 2002). Furthermore, many universities at the department level have developed their own purchasing practices over time. This type of independent culture can make spend consolidation challenging (Goral 2005). It leads to supplier proliferation that dilutes the organization's procurement management focus, limits the ability to develop high-level partnerships with important suppliers, and makes supplier development expensive to undertake with

such a large supply base (Warger 2002). A growing number of IHEs, however, are adopting, in varying degrees, the two basics of procurement strategies, namely rationalization and consolidation. For instance, IHEs are standardizing purchases of personal computers, notebooks, and even travel services. This allows them to negotiate the best prices for volume deals with vendors (Goral 2005).

While rationalization and consolidation are an appropriate start for many purchased products and services, certain procurement approaches are more effective for the purchase of certain supply segments than others. Like business organizations, IHEs are focusing on products and services of low strategic value with ample capable suppliers. These purchases include maintenance, repair, and operating (MRO) items as well as other generally neglected categories for office supplies and equipment, laboratory and classroom supplies, travel, and communications services. Since transaction costs are high relative to the value of these products and services, the focus is on reducing transactions costs, rather than developing key relationships with suppliers (Johnson 2003). These items are ideal candidates for automation and consolidation (primarily via e-procurement practices) (Anonymous 2002; Minahan 2004; Moody 2005; Rudzki et al. 2005; Sain et al. 2004), and outsourcing (Anonymous 2002; Minahan 2004).

Best-practice firms are widely outsourcing spend categories such as travel, printing services, and contract labor since these categories have much more complex, fluctuating characteristics compared to MRO and office supplies (Minahan 2004). These transactions require detailed configuration and pricing capabilities that, in many cases, take too long and/or are too expensive to develop. They are good candidates for outsourcing, and firms that outsource experience significant process efficiencies, head count and administrative cost reduction, and improvement in order and invoice accuracy (Minahan 2004). This is consistent with the strategies advanced by Kraljic (1983) promoting differentiation of purchases by the importance to the firm and the relative risk represented by the scarcity or nature of the supply market.

Procurement organizations automate and consolidate processes through adoption of e-procurement technology. Generally, both businesses and IHEs

venture into technology application with the adoption of P-cards. Later, other e-procurement solutions such as online catalogs of merchandise from preferred vendors are added. End users authorized to make purchases can buy a host of items through the online catalog without having to price shop since prices are negotiated with the vendor in advance (Aberdeen*Group* 2005a; Warger 2002). The result is a streamlined purchasing process that removes the usual paper-intensive and time-consuming reviews and authorizations by purchasing staff for low-value, low-risk products and services (Aberdeen*Group* 2005a; Boulianne 2006; Warger 2002).

E-procurement is becoming the predominant procurement approach not only for low-risk, low-strategic-value purchases, but also for expensive and strategic products and services. In this case, e-procurement is used as a collaborative tool (Atkinson 2001). For example, many IHEs are using e-procurement to acquire expensive but low-risk items through reverse auctions, where a community of suppliers competes online for the business (Warger 2002). For key suppliers of strategic purchases, e-procurement is used to develop strategies, conduct research, and engage in collaboration between and among organizations (Atkinson 2001).

In implementing e-procurement initiatives, some IHEs develop their own e-procurement systems. Like many universities, the University of Pennsylvania adopted a marketplace model which they developed in cooperation with an e-procurement solution provider, called Penn Marketplace, through which approximately 70 percent of all purchase order transactions are handled (Aberdeen*Group* 2005a). In fact, the University of Pennsylvania's e-procurement system was praised as one of the best-in-class systems for IHEs. Through Penn's Marketplace, Penn has realized $77.4 million in cost savings, a 484 percent improvement in contract compliance, and an average cycle-time reduction from 18 days to less than one day, among various other improvements in process efficiency (Aberdeen*Group* 2005a). Unlike these IHEs with home-grown e-procurement systems, the majority of IHEs join a hosted network or a buying consortium (Warger 2002). In fact, buying consortia and service providers dominate the IHE procurement market to a greater extent than in the business sector. A total e-procurement solution for IHEs is still relatively uncommon (Warger 2002).

However, many universities are now moving toward deploying third-party electronic exchanges to enhance the identification of and spending with preferred suppliers.

Supporting Elements: Organizational Structure, Information Systems, and Processes

Many organizations fail to capture billions of dollars in procurement savings because they lack the skills, processes, and infrastructure to effectively manage procurement across all spending categories (Minahan 2004). Simply put, effective implementation of the aforementioned procurement strategies—after a baseline spend analysis—depends largely on an organization's supporting structure, systems, processes, policies, and performance measures.

Center-Led, Commodity-Based Purchasing Structure

The rising and expanding influence of purchasing in leading organizations is apparent. A 16-year longitudinal survey of large North American supply organizations revealed that purchasing has grown substantially in corporate status and influence since 1987 (Johnson, Leenders, and Fearon 2006). An example of this is Procter & Gamble (P&G), a best-in-class company that views purchasing as one of its core capability areas (Rudzki et al. 2005). At P&G, the global supply manager has tremendous influence over the organization in that he or she oversees not only purchasing but manufacturing, engineering, and other operational functions as well (Rudzki et al. 2005). To properly position purchasing within the organization and ensure its ability to contribute strategically, experts emphasize that the head (chief) procurement officer should be no more than one level removed from the chief executive officer. A direct reporting relationship between the two positions is not necessary, but regular communication and access is (Rudzki et al. 2005).

It is clear that organizations are also moving toward center-led purchasing operations, though not necessarily a centralized organizational structure. Most procurement experts believe that 15 to 20 percent of purchased materials and services, translating into billions of dollars in a large organization, can be saved by centralizing procurement and leveraging

organizations' buying power (Richter 2003). Reflecting the experts' notion, Aberdeen's survey and interview of procurement executives at 100 global enterprises show that best-in-class organizations that have transitioned to a center-led procurement operation and concentrated spend under purchasing management show significant improvements in many areas (Minahan 2005). Improvements include leveraged spending and negotiating power; standardized purchasing procedures; decreased percentage of maverick, or off-contract, spending (Aberdeen*Group* 2005a; Minahan 2005); and improved market intelligence and costing measures (Aberdeen*Group* 2005a).

Despite reports of success stories, many medium and large companies maintain decentralized, splintered, and uncoordinated procurement operations (Richter 2003). Decentralized purchasing operations have a negative effect on purchasing performance in a number of ways. For instance, a decentralized operation increases supplier proliferation and, in many cases, places one business unit in competition with another for the same supplier's work. Moreover, a decentralized operation makes it difficult to track and gather information for spend analysis, thereby preventing firms from recognizing redundant and over-specified purchases (Nelson et al. 2005).

Within center-led purchasing operations, best-in-class organizations form purchasing teams by commodities that, in many cases, are cross-functional in nature. Cisco, for instance, has 15 center-led commodity teams that develop strategies for their corresponding commodities (Carbone 2006). Similarly, DuPont has a procurement operation devoted solely to information systems procurement that is organized by commodity with teams for software, telecom equipment and services, and contract labor (Avery 2001). In many cases, these purchasing teams are cross-functional, involving functions such as engineering, research and development (R&D), finance, and marketing (Minahan 2005; Nelson et al. 2005; Rudzki et al. 2005). And, when faced with strategic decisions such as bid evaluation and supplier selection, these leading organizations will pull business unit leaders, together with other functions, into the decision-making process (Minahan 2005). By including all parties in the decision-

making process, many firms experience higher contract compliance rates as well as improved visibility of spend and demand. Moreover, this level of involvement will tend to increase the percentage of spend managed by the procurement group (Minahan 2005).

Automated Procurement Processes And Integrated Systems

Leading-edge organizations invest in and leverage purchasing-related technologies for the automation of activities to a greater degree than others. On the whole, these leading firms better utilize information systems across the entire organization to enable procurement performance. In fact, leading organizations involve other functions in a procurement team in the form of both systems and professional resources. As an example, best-in-class organizations not only dedicate a finance professional as a core member of a procurement team, they invest and use financial systems to enable procurement performance as well (Aberdeen*Group* 2005b). Aberdeen's study (Aberdeen*Group* 2005b) on the chief financial officer's (CFO) view of procurement identified several financial systems that were tied directly to better procurement performance. These include a single or integrated ERP system, a financial analysis/business intelligence (BI) tool, a contract management tool, and the travel and entertainment/expense account management (T&E/EAM) application. Perhaps the foremost benefit of using these financial applications is better tracking and booking of procurement spending and savings—capabilities evident in best-in-class organizations that capture vast proportions of total corporate spend in their spend analysis systems (Porter et al. 2004).

Integrated, center-led purchasing organizations require highly integrated systems. Best-in-class organizations are now leveraging technology, primarily web-based, to automate various purchasing processes that cut across operations—from controls on the front end to management of the transaction, from uploads to the general ledger to pulling and analyzing management information (Aberdeen*Group* 2005a; Johnson 2006; Minahan 2005). To date, most procurement automation investments in business organizations have been tactical in nature, focusing on efficiency increases of existing processes (Minahan 2005). Aberdeen*Group* (Minahan 2005)

found the most commonly invested automation tools, in descending order of frequency of responses, are:

1. Supplier performance measurement application (tied at 54 percent)

2. E-procurement (tied at 54 percent)

3. E-Request for Proposal or E-Request for Quotation (39 percent)

4. Reverse auctions (37 percent)

5. Contract management (34 percent)

These tactical automation investments streamline and provide non-procurement personnel a web-based interface to initiate sourcing requests, thus removing many of the non-strategic and transactional activities that consume buyers' time (Minahan 2005). Benefits notwithstanding, tactical automation investments have often been disconnected, resulting in sub-optimized processes and savings leakage between one application/process area and the next (Minahan 2005). On the other hand, leading-edge organizations in supply management such as Hewlett-Packard, Dell, and IBM emphasize the use of innovative systems and well-integrated tools (Moody 2005), and are moving toward more cohesive and integrated source-to-pay platforms (Minahan 2005). These robust systems—combined with attention to detail (data definitions and coding) and infrastructure (system compatibility)—give organizations the ability to extend intelligence across the enterprise and improve coordination and control of spending and execution (Minahan 2005).

A fully integrated source-to-pay platform arises only after several actions are taken, including attention to process reengineering; long-term, comprehensive strategies; and involvement of all affected stakeholders (Minahan 2005). A case in point is RTI International's complete procurement-to-pay initiative. In the study on best practices in e-procurement (Aberdeen*Group* 2005a), RTI International was recognized as one of the best-in-class organizations in e-procurement. Before implementing e-procurement, RTI formed a cross-functional team to evaluate several e-procurement solutions, searching for a functional solution that needed only minimal user-training and implementation time. After selecting a solution, customers and end users were involved to review business processes and help determine

appropriate supplier catalogs to be included in the system. These pre-implementation actions helped RTI achieve savings of $300,000 a year, plus other "soft" dollar savings of about $500,000 a year (e.g., 70 percent reduction of cost per order and reduction of delivery cycle time from five to seven days) once e-procurement was implemented.

In the same fashion, IHEs are beginning to establish integrated, automated procurement systems as well. The procurement department at the University of Nottingham, one of the most popular universities in the United Kingdom, illustrates successful implementation of the automation and integration initiative in a complex purchasing environment. In fact, with more than 23,000 students, 5,000 members on staff, and £250 million annual spend, the University of Nottingham represents a complex purchasing challenge seen in many large universities (Riley 2002). Peter Simmonds, the university's procurement director, discovered in 1997 when he assumed the position that thousands of suppliers and at least a dozen different purchasing systems were in operation (Riley 2002). Among several improvement programs, Simmonds introduced a single corporate purchasing system that allowed individual purchasers to place orders and track their progress. In the meantime, details of the purchases were automatically transferred to the central procurement department, giving Simmonds and his team an essential overview of spending patterns. The new single, integrated system paved the way for the university to implement a web-based, paperless sourcing process and contributed, in part, to the more than £500,000 spend savings (Riley 2002).

Standardized Procurement Policies and Performance Metrics

Investing in procurement automation is critical for effective procurement management; however, ensuring its adoption is crucial for success. Best-in-class organizations deploy various means to drive user adoption of e-procurement (Aberdeen*Group* 2005a). Top management buy-in and support is clearly one way to drive adoption. Ease of use is also a key factor. Automated procurement solutions that minimize user-training and implementation time will have a higher rate of user adoption. Equally important is getting the end user involved as early as possible in the design and development of the automated solution to review and reengineer business processes

before implementation. Once processes are deemed efficient, end users can also provide valuable input to supplier catalog selections. Limiting procurement channels for employees once e-procurement is implemented and ongoing internal communication efforts to educate users on e-procurement benefits are other ways to drive adoption.

Thus, user adoption and inclusion of procurement transformation and automation initiatives are critical success factors for firms. Other success factors include well-defined governing policies for procurement and performance metrics that reinforce procurement compliance and drive success of the initiatives. Many best-in-class organizations devote considerable resources to standardizing metrics, policies, and procedures across sites and divisions (Minahan 2005).

Simply stated, a procurement function is measured based on the performance of its suppliers (Stanley 1999) since supplier performance impacts so many downstream processes—delivery time, rapid receipt, shipment accuracy, and others. Best-in-class organizations track performance of suppliers using standardized supplier performance metrics and/or systems that span the organization (Minahan 2005). Leading organizations also measure more of their supply base. In other words, they reach deeper into the supply base and track and share performance information with a broader portion of the base than average firms do (Minahan 2005).

In addition to standardizing metrics across the firm and incorporating them broadly across the supply base, best-in-class firms track multiple attributes of supplier performance. A *Purchasing Magazine* study showed that purchasing executives across the United States are incorporating multiple supplier performance measures that track quality, on-time performance, and cost competitiveness (Morgan 2000). Clearly, procurement automation, effective processes, and a center-led procurement organization all aid in supplier performance measurement.

Benchmarking Results and Key Findings

The eight participating universities were benchmarked on 18 criteria corresponding to the key elements of best-in-class procurement organization as shown in Table 1 on page 16. Methodologically, rather than force ranking the participating schools on each item, we assign a relative score of 0 for *no response*, 1 for *lagging* participation or performance, 2 for *average* participation or performance, and 3 for *leading* participation or performance (the higher the score, the greater the deployment of best practices as observed in industry). This approach prevents any future discussion that the methodology employed a level of precision greater than that required given the nature of the inputted data. Where answers to the questionnaire were substantially the same by the schools, those criteria were deleted from the analysis since a benchmarking process is a comparative exercise and depends upon the ability to identify net differences. Where no differences occur, no comparisons are possible.

Table 1 shows benchmarking scores of the 18 criteria for each university and relative performance rankings. Total scores range from 27 to 50. Schools were assigned performance labels of "leading" for total scores of 40 and above, "average" for scores between 35 and 40, and "laggard" for total scores below 35. Note that these designations only apply to the *relative performance* of participating schools within the study. In contrast, if the methodology employed for this study included statistical analysis, this sample would clearly have little significance given the high number of IHEs within North America. The value of this exercise, therefore, is in identification of those best practices within a single industry, namely higher education.

A number of key findings and practice trends can be discerned from the benchmarking results when

Key Findings

1. **Spend Analysis:** Improved spend analysis will advance university procurement practices.

2. **Purchasing Strategies:** University procurement organizations are beginning to engage in strategic supplier relationships.

3. **Purchasing Organization:** Leading university procurement organizations are reducing transaction gate-keeping; user-focused, cross-functional procurement management continues to evolve.

4. **Purchasing Process:** E-procurement investment is improving efficiencies, thus freeing resources to address effectiveness.

5. **Purchasing Policy:** Comprehensive purchasing policies are well documented.

6. **Performance Measurement:** Measurement criteria for suppliers and procurement management do not appear sufficiently synchronized.

compared to six key elements of a best-in-class procurement organization. These elements include (1) spend analysis, (2) purchasing strategies, (3) purchasing organization, (4) purchasing process, (5) purchasing policy, and (6) performance measurement.

Key Finding 1: Spend Analysis

Improved spend analysis will advance university procurement practices.
The participating universities are now embarking on the increased use of spend analysis to drive value. As shown in Table 2 on page 17, only one school is

Table 1: Relative University Performance

Criteria	Univ A	Univ B	Univ C	Univ D	Univ E	Univ F	Univ G	Univ H	Overall
Spend Analysis									
Cost per transaction	3	1	3	3	3	2	3	2	Leading
Spend visibility	1	2	1	1	1	2	3	0	Laggard
Purchasing Strategies									
Supplier rationalization	3	1	1	3	3	3	3	2	Leading
Strategic sourcing (Pareto)	1	3	2	1	1	1	3	2	Laggard
Supplier relationships	3	3	2	3	3	1	3	1	Leading
Purchasing Organization									
Range of responsibilities	1	2	3	3	3	2	3	2	Average
% of personnel placing order	2	1	1	1	1	1	3	3	Laggard
Procurement focus (narrow to broad)	3	3	2	3	3	1	3	1	Leading
Policy: cross unit collaboration	3	2	3	3	2	3	3	1	Leading
Purchasing Process									
E-procurement stance	3	3	2	1	3	3	3	2	Leading
Automation investment	2	1	1	2	2	3	3	1	Laggard
Use of e-transaction	3	2	3	1	1	3	3	1	Average
Purchasing Policy									
Documented comprehensive policy	2	1	3	3	3	3	3	3	Leading
Commodity code structure	3	2	3	3	2	3	3	1	Leading
Performance Measurement									
Supplier ratings	3	1	0	1	3	2	2	2	Laggard
Assessment of supplier performance	2	1	3	3	1	1	2	2	Laggard
Internal metrics of procurement	1	2	1	1	2	3	1	0	Laggard
Frequency of feedback to suppliers	2	3	2	0	2	2	3	1	Laggard
TOTAL	**41**	**34**	**36**	**36**	**39**	**39**	**50**	**27**	
RANK	**2**	**5**	**4**	**4**	**3**	**3**	**1**	**6**	
Benchmarking Position	Leading	Laggard	Average	Average	Average	Average	Leading	Laggard	

Table 2: Internal Measurement Criteria

Criteria	Univ A	Univ B	Univ C	Univ D	Univ E	Univ F	Univ G	Univ H
Total $ spend	▓	▓	▓	▓	▓	▓	▓	
$ Spend through P-cards	▓	▓	▓	▓	▓	▓	▓	
$ Spend through group agreements						▓	▓	
Cost savings	▓	▓					▓	
Contract utilization		▓				▓		
Number of suppliers		▓					▓	
Supplier consolidation efforts							▓	

Note: *Shaded areas show those measures employed.*

currently measuring all the criteria for effective spend and supplier analyses. The others, on the other hand, focus only minimally on these areas, thus hindering their ability to identify potential savings through supplier rationalization and spend leverage.

Spend

Figure 3 illustrates the relative amounts of spend with regard to total university operating budgets. The spend mean for the eight participating schools in the study is nearly 25 percent of total operating budget.

The range of spend across the schools is considerable, ranging from a low of 16.8 percent to a high of 39.5 percent.

Higher levels of spend may, in fact, represent higher levels of outsourced activities. While personnel expenses have traditionally been excluded from spend, these expenses are now being bundled into an organization's spend figure as the practice of outsourcing services continues to grow. Today, services and materials are frequently blended as the organization procures a turnkey solution. As an example,

Figure 3: Total Spend Versus University Operating Budget Figures

* Percent of spend versus operating budget

■ Total spend   ☐ University operating budget
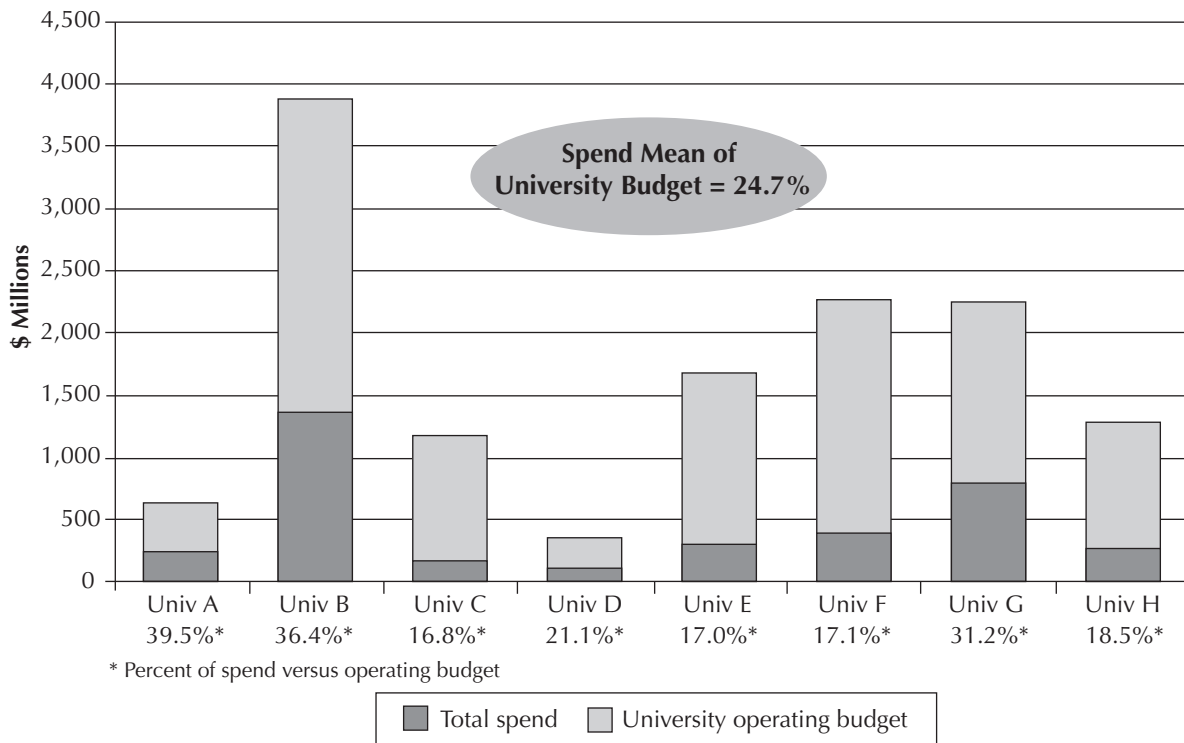
consider two different approaches to providing food services for an IHE. The first is an all in-house approach—the IHE hires staff and purchases materials and perhaps the equipment necessary for a university-operated food service. A second approach is an outsourcing option where the entire food service activity—staff and materials—is purchased from an outsourced provider such as Sodexho. Clearly, the former requires more procurement management in which direct materials, operating supplies, and capital equipment all must be procured in order to feed students, faculty, and staff. In the outsourcing alternative, the procurement organization is managing the relationship and performance of a single provider as the provider procures all materials and services to get the job done. The spend is concentrated with the outsourced provider and is higher than it would be for the in-house option since payroll is factored into the provider's costs.

Figure 4 shows the relative average cost per transaction in relation to the purchasing budget. The mean of average cost per transaction for the eight schools is approximately $29 per transaction. Average cost per purchase transaction of the eight participating schools varies as widely as their total spends, ranging from a low of less than $10 per transaction to a high of nearly $60 per transaction.

Suppliers

The identification and ongoing development of suppliers are important elements of the pre-transaction phase of procurement. If this phase is approached strategically, suppliers can offer more than just the requisite goods and services for the IHE. They can play a crucial role in the success of a university for the added value they provide beyond the simple fulfillment of the order. Improved transactional systems, vendor-managed inventories, and innovative products and services are all examples of the additional value suppliers can provide if procurement organizations recognize the opportunities and nurture the relationships. Value-adding relationships are characterized by extensive sharing of information between the trading partners. This sharing may include, but is not limited to, forecasts of future demand, plans for expanded activities such as research programs or increased enrollments, and budgetary conditions.

Nurturing a strong buyer-supplier relationship takes time and requires considerable resources. Moreover, not every supplier is a candidate for a collaborative relationship. In fact, most procurement organizations will rationalize their supply base first and consolidate purchases with the preferred suppliers. By consolidating purchases, the buyer increases its economic leverage over the supplier, and the supplier is willing to cooperate because of the increased volume.

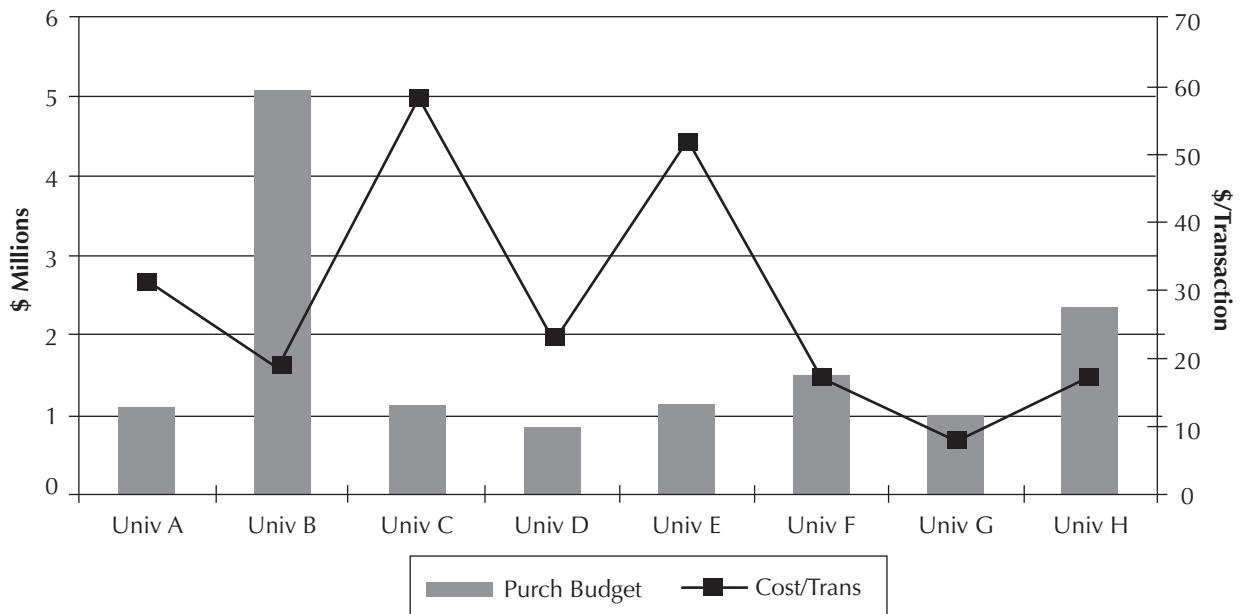**Figure 4: Purchasing Budget and Average Cost per Transaction**

Table 3 shows the number of suppliers reported by each of the participating schools as well as the relative leverage afforded to each. Leverage can be defined as the average annual spend per supplier. However, since there may be a number of small, specialized suppliers for an IHE, it may be more realistic to express leverage as the percentage of suppliers that generate 80 percent of the spend (a Pareto analysis).

Note that these data must be considered with care since the various participants represent different sizes and missions. Anecdotally, research-oriented universities may have larger supplier bases given the breadth of their requirements for specialized facilities, materials, and operating supplies. Those with teaching hospitals would also be expected to provide all of the equipment, supplies, and services needed to support a patient population; moreover, when such hospitals engage in clinical trials for new drugs and appliances, there is the possibility that they may include each patient subject as a supplier as well.

Table 3 differentiates between unique suppliers and active suppliers. Unique suppliers are those typically listed on the accounts payable system; in other words, at least one transaction has been recorded with this supplier. On the contrary, active suppliers, in most cases a much smaller number, are those recognized by the procurement system. The difference between unique suppliers and active suppliers is startling for some of the IHEs. At one extreme, one school counts only 3.4 percent of its overall supply

base of 147,000 unique suppliers as active. Either this university's spend is dispersed among a huge supplier base with little consolidated buys and/or little attempt to eliminate low-volume suppliers, or its purchases are very specialized and unique.

Key Finding 2: Purchasing Strategies

University procurement organizations are beginning to engage in strategic supplier relationships.

As shown in Table 3, half of the participating universities are applying some rigor to supply rationalization as 20 percent of their supply base represents 80 percent of spend. However, clearly there are opportunities for improvement compared to best-in-class organizations.

Referring to Tables 1 and 3 in combination, the correlation between having a rationalized supplier base and being a superior performer is clear—fewer suppliers are far easier to manage than a greater number. When spend is concentrated with relatively few suppliers, procurement is able to focus on strengthening supplier relationships.

In managing relationships with suppliers, different procurement organizations have different objectives and performance measures that guide them. As part of this study, the researchers asked several questions on supplier selection criteria. In other words, IHEs were asked: What are the primary drivers for selecting suppliers? Is the focus on price, delivery, total cost, quality, supplier capability, or best value?

Table 3: Supplier Base

University	Total Unique Suppliers (1,000)	Active Suppliers		Pareto Analysis: Percent of Suppliers That Provide 80% of Annual Spend
		Number (1,000)	Percent of Total Suppliers	
A	3.7	3.7	100.00	20%
B	230.0	38.0	16.52	4%
C	147.0	5.0	3.40	7%
D	25.0	3.0	12.00	20%
E	22.0	21.0	95.45	20%
F	8.0	8.0	100.00	20%
G	36.0	9.0	25.00	2%
H	60.0	10.0	16.67	15%

Table 4: Focus of Supplier Relationships

Criteria	Univ A	Univ B	Univ C	Univ D	Univ E	Univ F	Univ G	Univ H
Price						▨		▨
Delivery								
Quality			▨					
Total cost	▨	▨					▨	
Capability								
Best value				▨	▨			

Note: *Shaded areas denote reported emphasis.*

Table 4 tabulates the results, which are widespread. Two of the eight are focused on price and one on overall quality. The most popular answer was total cost, with three of the universities responding there. The remaining two are focused on best value for the school. Schools that are working with their suppliers on total cost or best value, both comprehensive indicators of supplier and procurement performance, are among the best performers, as shown in Table 1, even though University B is an anomaly here.

When price is the primary focus, procurement organizations tend to take on a myopic approach that often ignores other cost issues such as quality, delivery, and lead times. The impact can be higher costs manifested by higher inventories required to cover potential demand because of longer and more variable lead times; increased transportation costs stemming from FOB origin purchase terms and distant suppliers; and excessive administrative overhead incurred in procurement, thereby increasing transaction costs while seeking ever-lower supplier prices. Focusing on such a narrowly defined criterion like price will also inhibit good working relationships with suppliers and yield little in the form of value add for best-in-class procurement performance. Here, too, schools need to consider the lessons of strategic sourcing and focus their resources on achieving optimal total cost.

Finally, Table 4 highlights one definitional problem—namely, how to differentiate total cost from best value. For some, total cost implies the price of the goods, plus transportation, plus procurement of acceptable quality. By contrast, procurement organizations that can articulate best value are most likely involved in many aspects of the buy, particularly in the *specify materials* activity of the pre-transaction phase (as shown in Figure 1 on page 7).

Key Finding 3: Purchasing Organization

Leading university procurement organizations are reducing transaction gate keeping; user-focused, cross-functional procurement management continues to evolve.

Range of Responsibilities

Table 1 (row 6) on page 16 shows school rankings for the criterion *Range of Responsibilities*. To understand these rankings, it is important to note that not all procurement organizations are charged with the same array of responsibilities. Generally, procurement divides operational responsibilities by commodity type: direct materials, operating supplies (also known as maintenance, repair, and operating supplies, or MRO), equipment, repair parts and services, construction, and outsourced services. In a manufacturing environment, *direct materials* specifically include basic raw materials and components for assembly. In contrast, *direct materials* in educational institutions take on a *service* meaning and include educational materials, materials consumed by research activities, and library items. Operating supplies within an industrial context include laboratory supplies, facilities maintenance items, and a range of consumables such as those found in supporting automotive fleets. Universities have all of these plus those materials and services required to sustain housing and food service operations. For universities, equipment and the spare parts necessary to sustain their ongoing use are similar to industry as is facilities construction. The questionnaire explored some specific subcategories that included information technology equipment and athletic equipment. Utilities, a category that is universally applicable to industry and education, are defined as electricity, gas, and water. However,

telecommunications was broken out and included as its own item. Collection of all these data categories is essential in order to better understand the concept of "spend" and the overall share that university administrations delegate to the procurement activity per se.

Table 5 delineates the responsibilities by commodity category for each of the participating universities. With regard to the 18 performance criteria in Table 1, those procurement organizations with the broadest range of responsibilities are ranked highest and thus labeled "leading." It can be inferred that these organizations are in far greater control of their respective spends than those with a minimal range of responsibility.

Note that facilities construction is the commodity category most frequently excluded in the procurement portfolio of responsibilities. This category not only includes design and erection of new buildings, but also capital improvements to existing facilities. Because construction purchases are so specialized, they fit into the category of non-repetitive buys and can consume large blocks of procurement resources, depending on the relationship with facilities engineering and the complexity of the construction project. Of additional note, two IHEs claim no involvement with food and dining services.

Table 5: Range of Procurement Responsibilities

Commodity Area	Univ A	Univ B	Univ C	Univ D	Univ E	Univ F	Univ G	Univ H
Travel services		■	■	■	■	■	■	■
Facilities	■	■	■	■	■	■	■	■
Office supplies	■	■	■	■	■	■	■	■
Classroom, laboratory, and office furniture	■	■	■	■	■	■	■	■
Residence and dining hall furniture		■	■	■	■	■	■	■
Vehicles and facilities maintenance equipment		■	■	■	■	■	■	■
Design and construction		■	■	■	■		■	
Facilities maintenance services and supplies	■	■	■	■	■	■	■	■
P-card program		■	■	■	■	■	■	■
Laboratory supplies	■	■	■	■	■	■	■	■
Maintenance supplies	■	■	■	■	■	■	■	■
Educational materials	■	■	■	■	■	■	■	■
It equipment	■	■	■	■	■	■	■	■
Telephone services		■	■	■	■	■	■	■
Printing services	■	■	■	■	■	■	■	■
Athletic equipment	■	■	■	■	■	■	■	■
Food and dining goods and services		■	■	■	■	■	■	
Housekeeping and janitorial supplies	■	■	■	■	■	■	■	■
Utilities		■	■	■	■	■	■	■
Technology profile	■		■	■	■		■	■

Note: *Shaded areas show those commodity areas under procurement responsibilities.*

Purchasing Personnel and Experience

Procurement organizations vary considerably depending upon (1) how their institutions perceive the value that they add, (2) whether they choose to invest in the necessary resources, notably personnel and information technology, and (3) the policies that are enacted to strengthen the procurement function. Figure 5 summarizes the number of procurement personnel employed by the various schools and segments them by responsibility. Note that the size of a procurement organization can vary depending on (1) the size of the institution, (2) the degree to which it is research-based, and, as has been previously discussed, (3) the amount of responsibility the procurement organization is given.

Transaction processing usually consumes a disproportionate share of personnel resources unless the organization invests significantly in automating this process. Thus, *supplier selection and contracting* as well as *place orders*, both very transactional processes, should consume more resources if automation is not deployed. Higher value-added activities would include *sourcing strategies* and *appraising and developing suppliers*. As shown in Figure 5, the leading school devotes greater than 80 percent of its resources to the higher value-added activities, while most others devote better than half of their personnel to transactional activities. Clearly, the leading school has invested in automating the transaction

process so that its organization can focus resources on the value-added processes.

Figure 6 shows who within the organization is responsible for the order-placement transaction. Leading procurement organizations will generally "push" order placement out to the using units, so they can concentrate on higher value-added activities. However, University H appears to be an anomaly in this regard.

As an organization moves from transaction-oriented procurement activities to value-added activities, the competencies required to take on such tasks are key. Two competency measures are (1) the amount of experience resident in the procurement function, and (2) the amount of training that the function undertakes in negotiations. Figure 7 captures the data showing combined years of experience within three components: strategic sourcing, purchasing operations, and negotiations training. Here the data is clearly counter-intuitive. While there appears to be a high correlation between the number of years of experience and the amount of negotiations training, there is, conversely, an apparent low correlation between (1) overall performance and combined years of experience, and (2) overall performance and training in negotiations. Interestingly, several leading performers (Universities A and G) had the least experienced staffs and were among the least experienced in negotiations training.

Figure 5: Numbers of Procurement Personnel by Activity
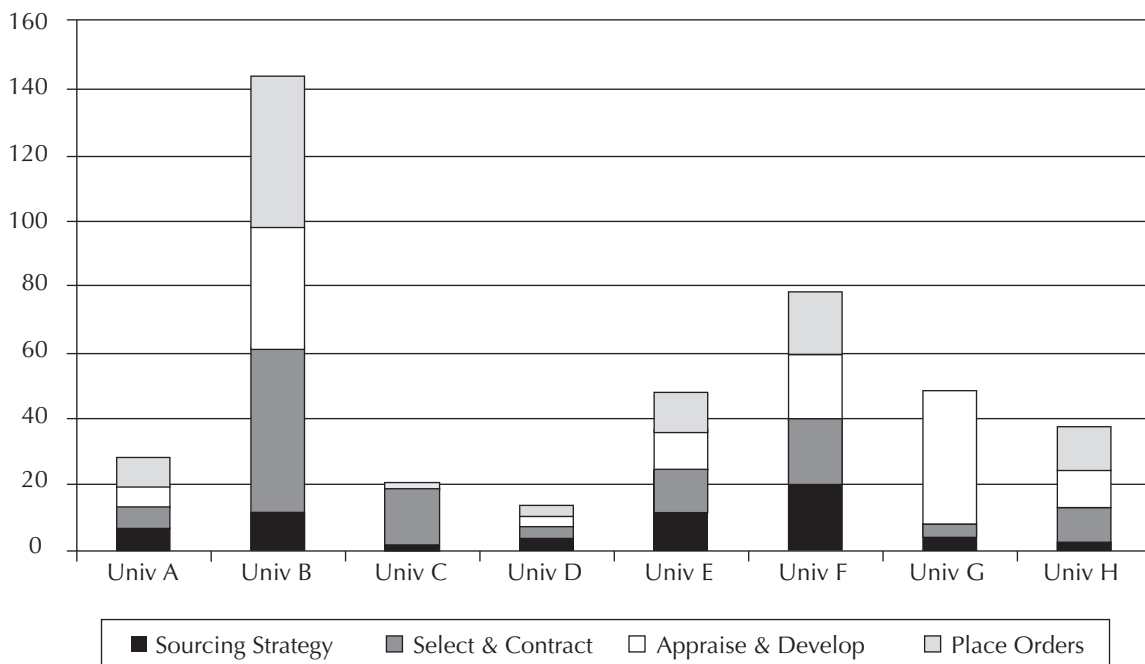
Figure 6: Responsibilities for Order Placement
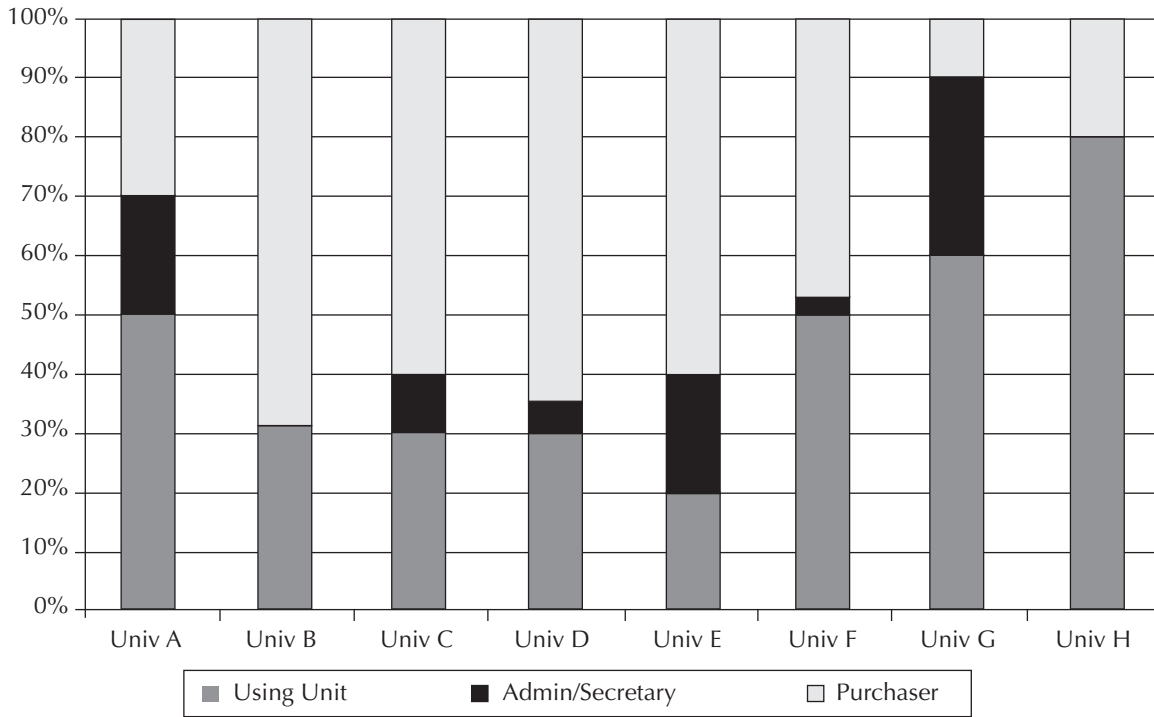
In evaluating procurement staff, this study also considered participation in leading professional organizations, such as the Institute for Supply Management (ISM), formerly known as the National Association of Purchasing Management. For nearly 30 years, ISM has promoted the leading credential in procurement called Certified Purchasing Manager (C.P.M.). This designation is earned through a

Figure 7: Number of Purchasing Staff with Experience in Strategic Sourcing, Purchasing Operations, and Negotiations Training
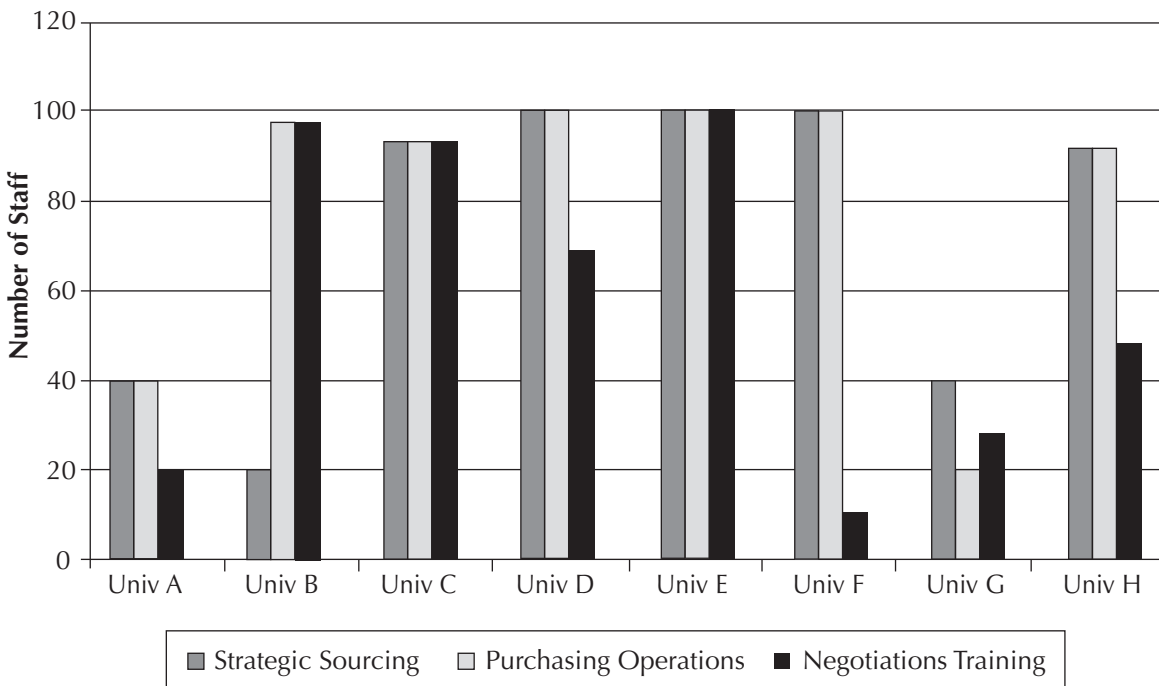
combination of experience and successful completion of a qualifying examination and would suggest that an employee is of such a professional caliber to add great value to the procurement function. Although working with a very small sample that is not anywhere near statistically significant, the results of this research may suggest otherwise. Figure 8 shows that the leading school (University G) not only had few C.P.M.s on its procurement staff, but also had few pursuing the credential.

Key Finding 4: Purchasing Process

E-procurement investment is improving efficiencies, thus freeing resources to address effectiveness.

Transactions

The correlation between strategic sourcing and the manner that transactions are processed can be found in the internal methods used for placing orders with suppliers. The cost per purchase transaction is significant as individual schools show a considerable range. Using Figure 4 (on page 18) and Figure 9 in concert shows that the leading school has the lowest cost per transaction, but also has the highest number as well as the highest percentage of electronic transactions (e-transactions). This suggests that there appears to be a direct correlation between these two variables. Schools with the highest percentage of paper

transactions (Universities D and E) are also those with the higher cost per transaction. While care must be used in interpreting these data, we also found a correlation with policies espousing strategic sourcing, thereby implying that e-transactions are employed in those categories of goods and services having low transaction value. Here we differentiate e-procurement from P-cards, where the former is a process using pre-selected suppliers and online catalogs. Requisitioner (or user) identification and password access provides budget line item charge information; hence, the transactions represent controlled spending for these repetitively procured items and services. In contrast, P-cards are most useful in simplifying non-routine and emergency purchases; however, there is little control over supplier selection and P-card statement reconciliation can prove complex depending on the policies and applicable processes of the individual school.

Figure 9 illustrates various means by which schools place orders with suppliers. Participants were asked to tally the number of transactions placed electronically, by telephone, by paper, or by other means. Even though University C appears to be another anomaly, those schools with relatively low transaction costs show the largest absolute numbers of electronic transactions. One of the laggard schools (University B) has the highest absolute number of paper transactions. The conclusion appears to be

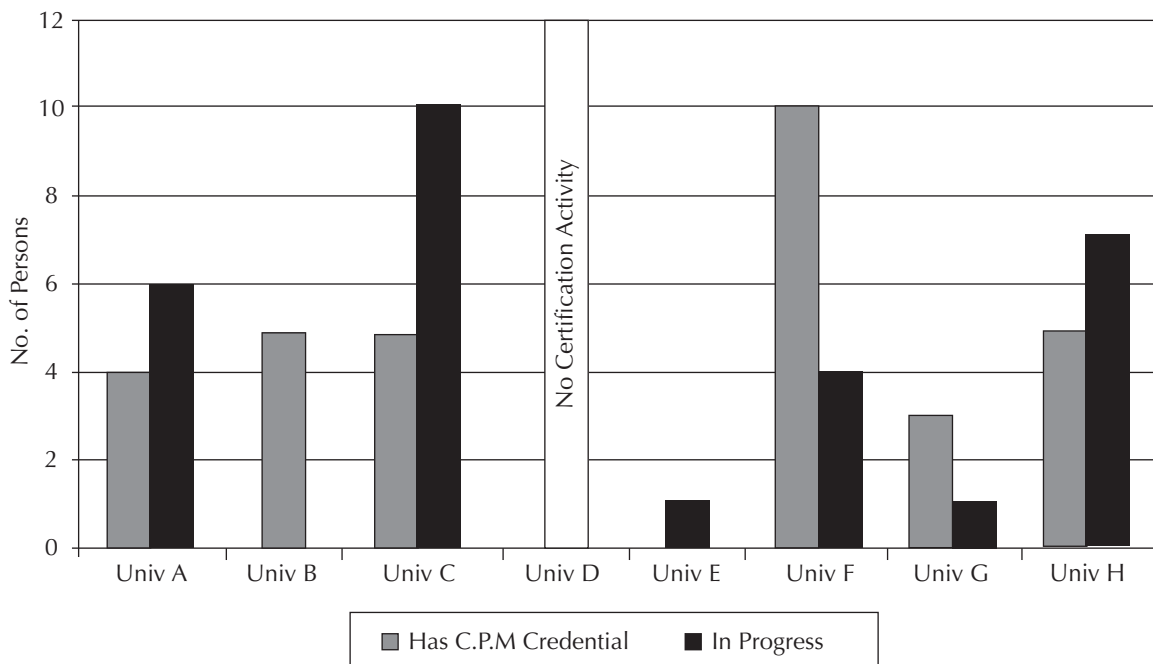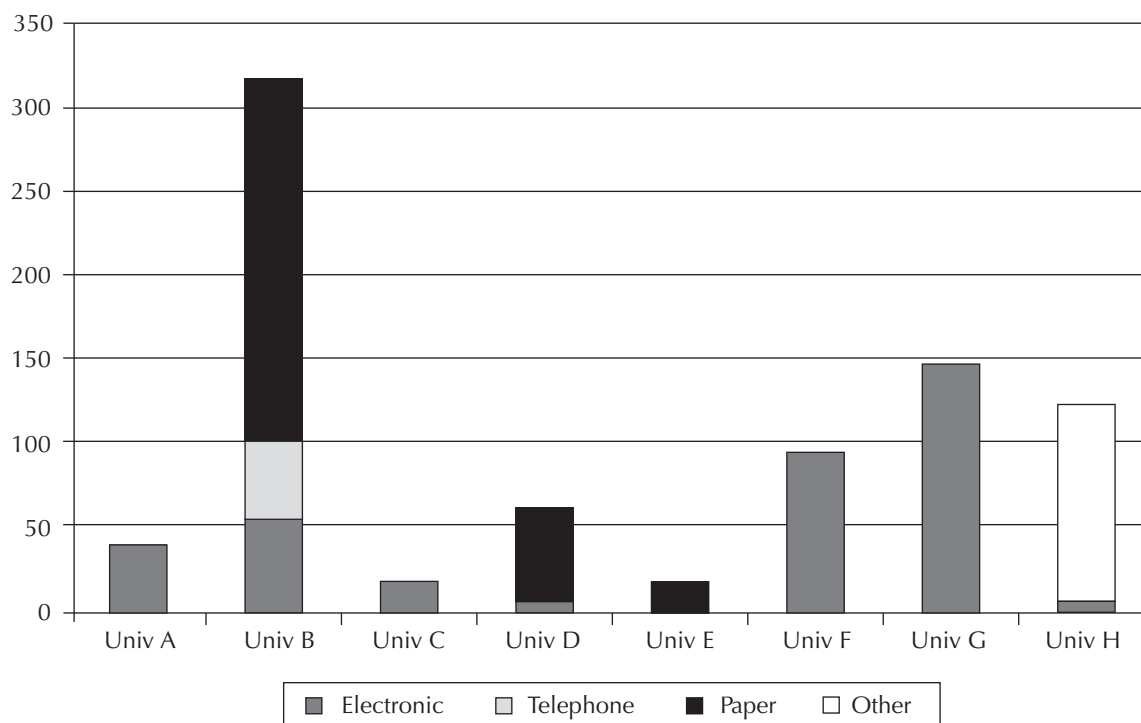**Figure 8: Certified Purchasing Managers Amongst Participants**

Figure 9: Order-Placement Methods Distribution

that electronic transactions are important for driving down costs, but it also appears to suggest that business process reengineering is a necessary prerequisite to reaping the benefits from e-transactions.

Systems Applications

As IHEs endeavor to drive value from their procurement activities—in terms of both spend efficiency and procurement effectiveness—in providing their various operations and departments with the goods and services required to execute the educational mission, the use of information technology has become a recurring theme. For this study, the questionnaire probed (1) system applications that the schools have already implemented, and (2) those applications that the schools deemed important. Although a range of questions were asked about both, the meaningful responses were found within six transaction functionalities and three post-transaction functionalities. There were no pre-transaction functionalities under consideration.

As shown in Table 6 on page 26 the functionalities implemented tended to cluster around the early activities of the transaction phase. Also, many schools were inclined to implement technologies that link procurement to the overall enterprise *(links*

to ERP system). Transaction modules most often implemented were the *electronic catalog* (e-catalog) and *electronic requisitioning*. *Electronic order placement, online access to suppliers' inventories, online order status*, and *electronic invoice payment* were only partially implemented by most participating schools. In fact, *electronic invoice payment, online access to suppliers' inventories,* and *online order status* were the least implemented functionalities. Only two schools reported full or partial implementation of all functionalities.

Among the post-transaction functionalities, most of the schools had already implemented disaster backup capabilities as well as linkages between the procurement system and their universities' ERP systems. The ability to capture summary reports—to understand how much is being spent, on what, and with which suppliers—is fundamental for effective procurement management, yet only half of the schools have this capability fully implemented and another three partially implemented.

In addition to the extent of systems implementation, participating schools were asked to rate the relative importance of functionalities using the terms *essential, somewhat important*, and *not important,* regardless of whether they currently possess the

Table 6: Implementation of Procurement Systems Functionalities

	Univ A	Univ B	Univ C	Univ D	Univ E	Univ F	Univ G	Univ H	
Electronic catalog	Not implemented	Some implemented	Some implemented	Fully implemented	Fully implemented	Fully implemented	Fully implemented	Some implemented	Transaction Phase
Electronic requisitioning	Fully implemented	Some implemented	Fully implemented	Fully implemented	Fully implemented	Fully implemented	Fully implemented	Not implemented	
Electronic order placement	Fully implemented	Some implemented	Some implemented	Fully implemented	Some implemented	Fully implemented	Some implemented	Some implemented	
Online access to supplier inventory information	Some implemented	Not implemented	Not implemented	No capability	Some implemented	Some implemented	Some implemented	Some implemented	
Electronic invoice payment	Some implemented	Fully implemented	Not implemented	Not implemented	Not implemented	Fully implemented	Some implemented	Not implemented	
Online order status	Not implemented	Some implemented	Not implemented	Some implemented	Some implemented	Some implemented	Some implemented	Some implemented	
Range of summary reports	Fully implemented	Some implemented	Fully implemented	Some implemented	Not implemented	Fully implemented	Fully implemented	Some implemented	Post-Transaction
Links to ERP system	Fully implemented	Not implemented	Fully implemented	Fully implemented	Fully implemented	Some implemented	Fully implemented	Not implemented	
Disaster backup	Fully implemented	Fully implemented	Fully implemented	Fully implemented	Fully implemented	Fully implemented	Fully implemented	Some implemented	

Legend: Fully implemented | Some implemented | No capability | Not implemented

functionality. As shown in Table 7, a similar clustering emerges around the early activities of the transaction phase and the latter activities of the post-transaction phase. There are, however, notable exceptions. While most participating schools implemented online catalogs, only one school claimed that module to be essential, with four schools citing it as not important at all. *Electronic requisitioning* received a unanimous essential rating, and *electronic order placement* a nearly unanimous essential rating. *Online order status* received a tepid rating (somewhat important) by most schools. Earlier it was noted that schools tend to give little priority to on-time deliveries, thus it is not inconsistent that little priority is given to *online order status*. *Electronic catalogs* were deemed not important by half of the schools, including some that had already made either a full or partial implementation of that capability.

Table 7: Relative Importance of Procurement System Functionalities for Direct Materials

	Univ A	Univ B	Univ C	Univ D	Univ E	Univ F	Univ G	Univ H	
Electronic catalog	Not important	Somewhat important	Not important	Not important	Essential	Not important	Somewhat important	Somewhat important	Transaction Phase
Electronic requisitioning	Essential	Essential	Essential	Essential	Essential	Essential	Essential	Essential	
Electronic order placement	Essential	Essential	Essential	Essential	Somewhat important	Essential	Essential	Essential	
Online access to supplier inventory information	Essential	Essential	Somewhat important	Essential	Essential	Essential	Essential	Essential	
Electronic invoice payment	Essential	Essential	Not important	Not important	Not important	Essential	Somewhat important	Not important	
Online order status	Essential	Essential	Not important	Somewhat important	Somewhat important	Essential	Essential	Essential	
Range of summary reports	Essential	Essential	Essential	Essential	Essential	Essential	Essential	Not important	Post-Transaction
Links to ERP system	Essential	Essential	Essential	Essential	Somewhat important	Essential	Essential	Somewhat important	
Disaster backup	Essential	Essential	Essential	Essential	Essential	Essential	Essential	Essential	

Legend: Essential | Somewhat important | Not important

Consistent with the implementation findings in Table 6, three schools, including University G (a leading school) termed seven of the nine modules as *essential*, while most schools termed five or more of the modules *essential*.

Key Finding 5: Purchasing Policy

Comprehensive purchasing policies are well documented.

Universities vary in the strategic imperatives and policies that their administrations place on procurement functions. This study queried the participating schools on a range of policy positions to determine what really drives the purchasing function within each school. Is the focus on commodity management? Is it significant process redesign? Is it the deployment of technology? Is there a strategic focus? In other words, is there a comprehensive purchasing policy that is documented and followed? This study also queried schools to find out how much interaction the function has with others in the organization, specifically whether or not there is a cross-functional, collaborative approach to the procurement of important goods and services.

Table 8 shows how that distinction is manifested in policy. Three participating schools reported a commodity management focus; one, a process redesign focus; and the remaining schools focused on purchasing technology improvement, which may, in fact, be another approach to process redesign.

The other responses tabulated in Table 8 provide additional policy insight. Most schools do have a *documented comprehensive policy* for purchasing, an integral component for establishing guidelines and setting strategic direction for the function. Additionally, most employ *cross-organizational collaboration* and a standard *commodity code structure*. The use of a commodity code enables the organization to identify items and subsequently collect relevant information and to analyze volumes, sources, prices, and uses. It is seen by many procurement organizations as the key enabler to improving supplier leverage. A documented policy communicates to the rest of the university the role assigned to the procurement function. As such, it should remove any doubt as to which function is responsible for which aspects of the activities of the procurement cycle.

Table 8: University Procurement Positions on Policy

	Primary Focus of Procurement Initiatives	Importance of Documented Comprehensive Policy	Cross-Organizational Structured Collaboration	Commodity Code Structure Is in Place
Univ A	Commodity management	Ad hoc or some	Full or comprehensive	Full or comprehensive
Univ B	Commodity management	None or organizational "islands"	Ad hoc or some	Full or comprehensive
Univ C	Purchasing technology improvement	Full or comprehensive	Full or comprehensive	Full or comprehensive
Univ D	Purchasing process redesign	Full or comprehensive	Full or comprehensive	Full or comprehensive
Univ E	Purchasing technology improvement	Full or comprehensive	Ad hoc or some	Full or comprehensive
Univ F	Commodity management	Full or comprehensive	Full or comprehensive	Full or comprehensive
Univ G	Purchasing technology improvement	Full or comprehensive	Full or comprehensive	Full or comprehensive
Univ H	Purchasing technology improvement	Full or comprehensive	None or organizational "islands"	None or organizational "islands"

Full or comprehensive	Ad hoc or some	None or organizational "islands"

Articulated strategies appeared to bear some agreement among schools. For example, Figure 10 shows that the first and second highest priorities were *strategic sourcing* and *e-procurement*. Only one of the leaders cited *supplier consolidation* as a high priority. This suggests that most of the participating schools are seeking to improve how they allocate resources (strategic sourcing) across the types of goods and services they acquire while concurrently seeking to streamline transactional activities.

Training and education, supplier consolidation, and *transaction processing* were clearly lower priorities. Transaction processing ranked at the bottom by most participating schools.

Key Finding 6: Performance Measurement

Measurement criteria for suppliers and procurement management do not appear sufficiently synchronized.

Performance of the procurement function cannot be deemed satisfactory unless the performance of the supplier base is also deemed satisfactory. As shown in Table 9, the leading schools measured supplier

performance on a range of criteria; however, it is also observed that some of the lagging and average performing participating schools may be measuring the widest range. *Average supplier payment time* was the criterion used most by the IHEs. This metric is not customer-facing per se, but is important if used for managing positive supplier relationships. In some cases, but not ascertained by this research, this measure is used by accounts payable to optimize cash flow opportunities, an action that usually leads to poorer supplier relationships.

The principal customer-facing criterion, *line items received without damage*, was reported by seven of the eight participating schools. In contrast, at least half of the participants claimed to not measure *average supplier lead time, orders received on time, orders received damage-free, orders received complete,* and *line items received complete*. Knowing supplier lead time is central to the issue of inventory management, as stated previously. All of the other measures are customer-facing, specifically addressing quality and delivery factors. The ability to receive ordered goods in the stated quantity, at the required time, and in good condition has been a central theme of appropriate procurement practice

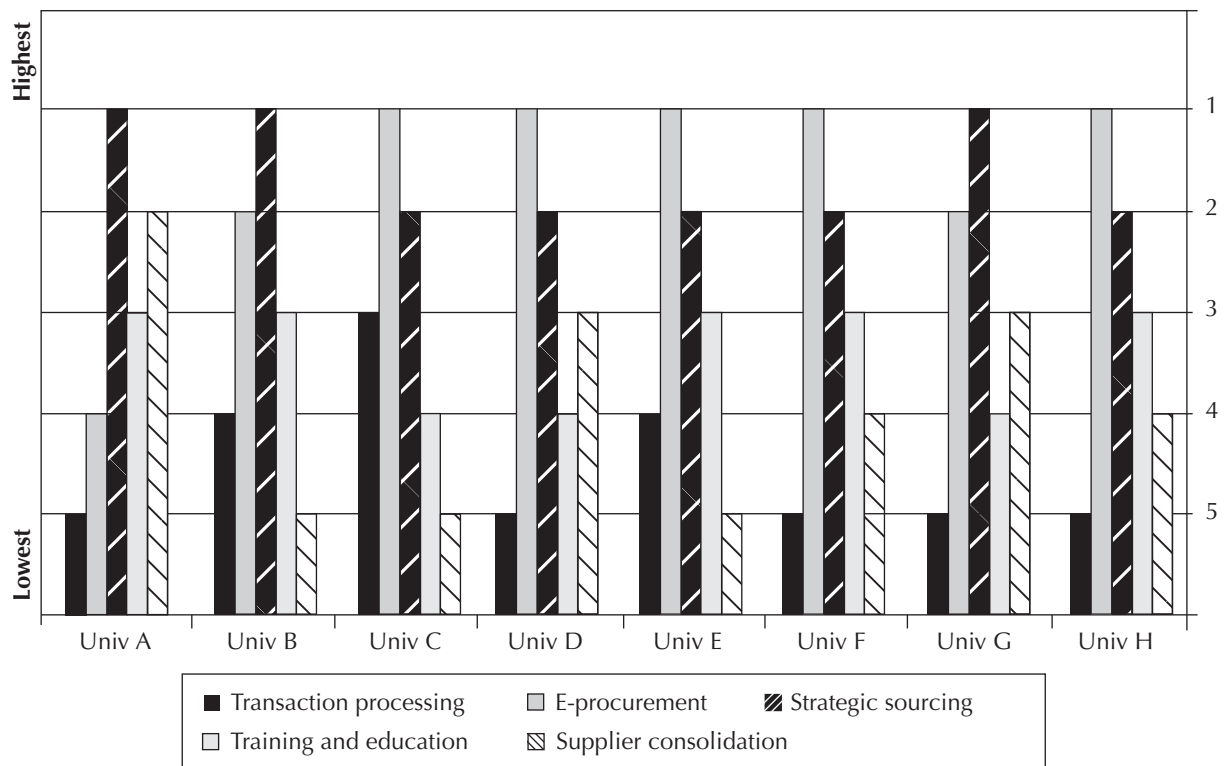**Figure 10: Forced Rankings of Importance of Procurement Initiatives (Ranking 1–5)**

Table 9: Supplier Performance Criteria

Criteria	Univ A	Univ B	Univ C	Univ D	Univ E	Univ F	Univ G	Univ H
Average supplier lead time	▓		▓	▓			▓	
Percent on-time or early deliveries	▓		▓	▓		▓		
Average supplier payment time	▓	▓	▓	▓				
Orders received without damage	▓			▓				▓
Line items received without damage	▓		▓	▓			▓	▓
Orders received complete	▓		▓	▓				▓
Line items received complete				▓				

Note: Shaded area depicts those criteria employed.

in manufacturing environments for decades. Although not faced with the potential of shutting down production operations, university research activities would be expected to have similar time concerns. Time utility is seen as a key underlying concern given that damaged, incomplete, or late deliveries all equate to an inability to complete anticipated or scheduled tasks. For this reason, it is surprising that only one school measures *line items received complete*. *Line items received without damage* is more frequently measured than *orders received without damage*. While one may be used in the aggregate to imply the other, the number of orders received damaged, late, or incomplete also may become procurement workload factors. This may be true because lines may not be fully distributed across orders—there may be a volume of orders with only a single line as well as some containing multiple lines.

Table 10 addresses the frequency that the procurement organization shares performance measures (and thus works on performance improvements) with its suppliers. It is not surprising that our leading performer (University G) shares data with its suppliers on a quarterly basis. Another leading school (University A) provides annual performance reviews, but also employs sporadic reviews ostensibly to resolve serious performance shortfalls incurred by specific suppliers. One of the laggards (University H) provides no performance reviews with suppliers. Those schools performing only sporadic reviews, again assumed to be situations attempting to resolve specific performance problems with individual suppliers, have been labeled *average*.

The broad range of measures used to rate suppliers, and clearly those that are used when deciding to renew relationships, is found in Table 11 on page 30. The leading criterion—used by 75 percent of the

Table 10: Frequency of Providing Suppliers with Performance Feedback

	Univ A	Univ B	Univ C	Univ D	Univ E	Univ F	Univ G	Univ H
Annually	▓			*				
Quarterly		▓		*			▓	
Sporadically	▓		▓	*	▓	▓		

*Note: Shaded areas show reported results; * indicates no data provided.*

Table 11: Non-Transactional Supplier Performance Measures

Criteria	Univ A	Univ B	Univ C	Univ D	Univ E	Univ F	Univ G	Univ H
Supplier quality	■			■	■	■		■
Innovative products/services	■	■			■	■	■	■
Cost reductions/Total Cost of Ownership (TCO)	■	■			■	■	■	■
Supplier responsiveness	■				■	■	■	■
Willingness/ability to provide collaborative technology	■			■	■			
Innovative business processes	■	■			■	■	■	

Note: *Shaded areas show those measures employed.*

participants—is *cost reduction.* (Care needs to be exercised to be certain that the measure is true cost reduction and not just price reduction.) Most schools also cite *supplier quality, supplier responsiveness,* and *the ability to provide innovative goods and services.*

The ability of suppliers to provide collaborative technology was the least used criterion. While the nature of the research prevented further probing of this issue, there has been a long-standing argument that employing technologies offered by an array of leading suppliers may lead to difficult supplier management efforts. Instead, in the industrial sector, procurement organizations often acquire a standard software tool and expect suppliers to connect to it.

There was modest correlation between top-performing participants and the adoption of these supplier performance criteria. For example, the lower relative performers tend to employ fewer measures; whereas better performing schools tend to employ most or all of the measures asked. Interestingly, both the leading performer and the most lagging performer employed the same number of measures—and, indeed, fairly similar measures. Moreover, neither perceived any importance in valuing suppliers who provided collaborative technologies, even though the leader is a significant user of this capability.

While it is important to determine how well procurement is serving the overall needs of its internal customers, supplier data is typically augmented by measures of how well procurement is conducting spend or the financial aspects of its responsibilities. As shown earlier in Table 2 (on page 17), the participating schools capture seven internal measures to evaluate performance. These measures can be segmented into two related to spend, three on transaction effectiveness, and two on the supplier base. Of those data collected, the easiest to obtain are the most ubiquitous, specifically *total dollars of spend* and *dollars of spend on P-cards*.

The three measures related to transaction effectiveness, specifically *dollars of spend through group agreements*, *cost savings,* and *contract utilization,* are each employed by less than half of the participating schools. Perhaps of most concern is that there are two participating schools driven by a purchase price focus (Universities F and H; see Table 4 on page 20), yet they do not report that they collect savings data (see Table 2 on page 17). Note that the leading school G collects the greatest range of these data, whereas the laggard school H did not report collection of any measures (as reported in Table 2). All participating schools reported having some modicum of purchase contracts in place, either system-wide or as group agreements with, for example, state governments or school consortia. Contracts are a useful approach for driving down procurement costs, but can only do so when employed. Additionally, the need to measure this activity becomes obvious.

The final pair of criteria, *number of suppliers* and *supplier consolidation efforts*, address the supplier base. Only two participating schools maintain statistics on the number of suppliers. One of them also measures its effort to rationalize the supply base or consolidate its number of active suppliers. Note that these results appear to conflict with Table 3 (on page 19), where schools reported the number of active suppliers. One possible explanation may be in how the number of suppliers is tabulated. Perhaps there is a discrepancy between procurement and accounts payable.

Final Thoughts

The intent of this research was not to force a relative performance ranking on just a few leading U.S. universities, but to gain an understanding of where the state of procurement practice is in higher education. We are grateful for the openness with which these schools bared their souls and the time commitment that they invested in researching the answers to our questions. All of the individuals, no matter the outcome of the benchmarking, expressed an appreciation for what they learned about themselves. We must reiterate to the reader that these eight schools may well represent some of the best procurement practices to be found in North America. Their leadership understands the value that procurement can bring to universities. They have much to share with the nearly 3,000 other institutions of higher education that include other large, well-known schools, a significant number of state universities, myriad private colleges, and hundreds of community colleges.

Best practices can be an elusive term as information technology continues to advance at a rapid pace. Technology applications, however, are not the only place where best practices can be found. It became abundantly clear that technology is a key enabler, but the underlying processes and procedures must be reengineered with an eye toward effectiveness. Procurement functions at the leading schools realize their best use of human capital by discovering and applying innovative ways to make their institutions more competitive, whether the measure is reducing operating costs or improving timely responsiveness of their research endeavors.

By engaging the universities that constitute the Innovators' Circle (SciQuest's IHE e-procurement early adopter group), this research can be viewed as a story of what *can be* rather than what is. These schools possess best practices because they sought self-improvement, not because they sought to compare themselves to others. As processes continue to evolve and technology advances, the best practices of today will be commonplace tomorrow. Coupled with implementation lead times, this means that those who try to copy will likely be two or more years behind in practice.

Considering the recurring underlying themes of the procurement activities of the successful universities with whom we have worked, we would conclude the following:

1. There are no magic bullets. Building world-class university procurement operations only comes from a lot of blocking and tackling. There is some truth in the statement, "If it was easy, everyone would do it."

2. Effective procurement is all about customer service and adding value to the various elements of the university's mission. It is also about understanding what is important to the customer, not what is important to fulfilling an administrative requirement.

3. An old adage says, "If you can't measure it, you can't manage it." Supplier performance is no exception, but neither is procurement performance. Suppliers need to understand the customers' expectations and know how well they are fulfilling them. By similar measure, procurement must understand customers' needs; hence, early procurement involvement and early supplier involvement are imperatives.

4. Perfection, whether it is of processes, organizations, or performance, is not achievable because conditions are constantly changing requirements. Continuous quality improvement is key to progress, but with it comes the need to recognize that change is constant.

Appendix I: Methodology

Benchmarking is a mature process at least to the extent that similar organizations have been able to compare budgets and other quantifiable measures such as prices paid, operating costs per unit of output, or units of output per capita. It was not until 1980 when Sol Zivan and Robert Camp at Xerox sought to identify best practices in customer service that the concept of non-competitive benchmarking took hold. Rather than seeking comparisons with competitors such as Eastman Kodak and IBM, where access was difficult and a quid pro quo unlikely, Zivan and Camp identified L.L. Bean as a source for better comparison (Camp 1989). About a decade later, a consortium of firms approached Penn State's Center for Logistics Research to facilitate a benchmarking process. Non-competing firms would submit otherwise proprietary data concerning their import processes that could be analyzed and converted into a series of rankings and ratios without divulging confidential information (Young and Grenoble 1996). The resulting process became known as the Penn State Consortium Benchmarking Methodology, and it establishes the basis for this comparison of higher education procurement processes.

For this study, the participating IHEs do not appear to be direct competitors for either students or sponsored research projects, although there may be isolated instances. Much of the information that needed to be collected is "public record" and typically contained on the institutions' websites, reports to trustees, or annual filings with state legislatures.

Still, a questionnaire was used to collect this information as well as highly detailed strategic information on processes, systems, organization structure, performance, and other underlying business practices that are not usually obtainable from public sources.

The contents of the questionnaire were jointly developed by IBM's Public Sector Procurement Consulting Practice, SciQuest Corporation, and Penn State's Center for Supply Chain Research. The researchers incorporated insights and questions derived from IBM's Global Business Services' Benchmarking Collaborative, an organization that successfully executed *The 2005 Chief Procurement Officer Survey* among major commercial firms. The team also included questions deemed appropriate by SciQuest's IHE e-procurement early adopter user group called the Innovators' Circle.

Knowing the underlying theory and key independent variables needed to be determined first, the researchers realized that a comprehensive understanding had to be achieved before any widely distributed survey could be undertaken. The result was the creation of a 107-item questionnaire that would provide a comprehensive understanding of the procurement process as well as the operating environments of a relatively few—between eight and 12—participating schools. This was consistent with the methodology literature for qualitative research, such as Eisenhardt (1989), who advocated at least three respondents were needed to recognize some central tendency. Qualitative methodology, according to Miles and Huberman

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Obtaining a Copy of the Procurement Benchmarking Questionnaire

If you would like to obtain a copy of the Procurement Benchmarking questionnaire used by the Innovator Circle Benchmarking Program for this study, it is available from the Center for Supply Chain Research at the Smeal College of Business at Penn State University at http://www.smeal.psu.edu/cscr/pub.

(1994), is a messy affair; hence, more than 15 partici-pants can become unwieldy.

The questionnaire was completed by eight insti-tutions of higher education within SciQuest's Innovators' Circle group. The schools represent a reasonable range of important demographic char-acteristics including:

1. Number of students, both at the graduate and undergraduate levels

2. Number of faculty and staff, including information technology, physical plant, and administrative

3. Number of academic units

4. Varying number of branch campus locations in close proximity or at relatively remote locations

5. A research-oriented or teaching-oriented focus

6. Public or private control

For legal reasons, one quid pro quo for participation was that no individual school would be identified by name, nor would specific variables be made known that the casual observer would be able to discern a particular participant. The demographic characteris-tics, however, were seen as important independent variables for the following range of reasons.

Number of Students

Enrollment is an important, although not the only, defining characteristic of scale. The participating schools ranged from a low of 6,200 to a high of nearly 100,000 students inclusive of undergraduate and graduate students. Students require infrastructure for carrying out the educational mission; however, the questionnaire did not discriminate between resi-dent students and commuters. The former require dormitory space and dining facilities while the latter need extensive parking. Some of the schools had significant graduate and professional degree programs belying their research missions, while others accounted for some number of non-degree students who may actually be taking non-credit courses such as executive programs or continuing education offerings. Figure A.1 depicts the relative sizes of participating institutions, the range of which is important when considering their respective operating environments.

Faculty and Staff

At the outset, it was understood that there was likely little correlation between the number of students and the number of faculty and staff. Demographics are dependent on the activities or structure of the IHEs. For example, (1) a higher resident student

Figure A.1: Number of Students by Type
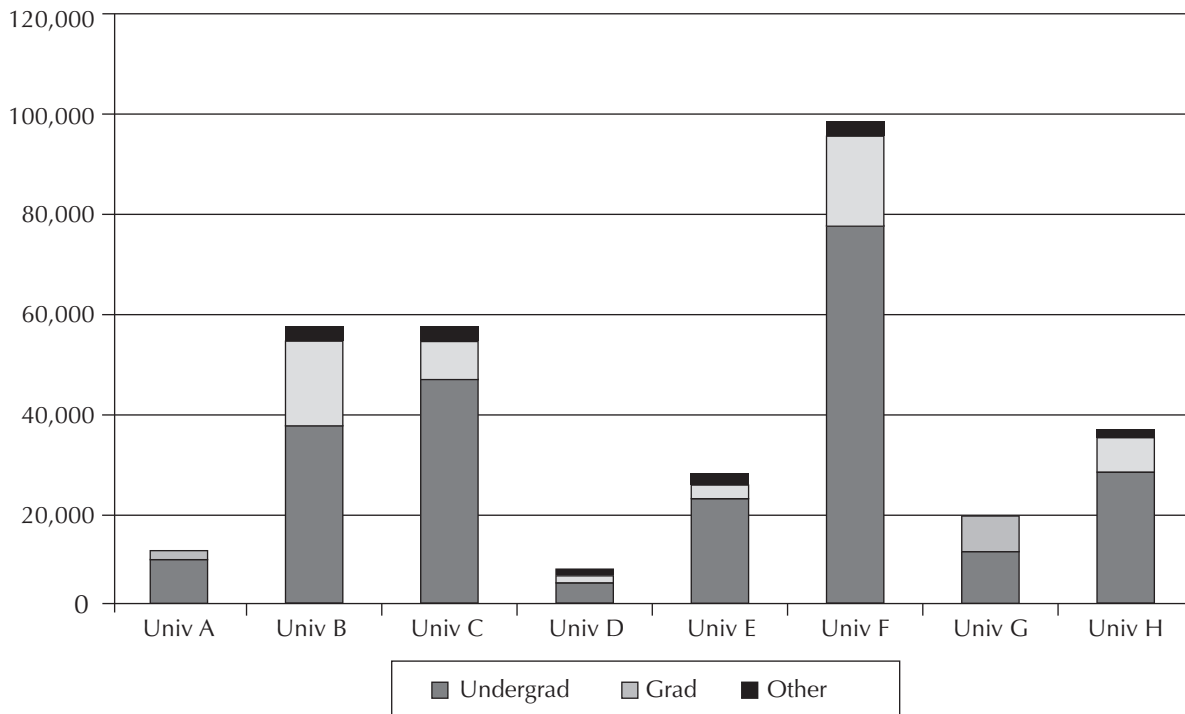
population requires more housing and food service staff, (2) research-oriented schools have a greater number of laboratories or other technical personnel than teaching-oriented schools, (3) medical schools and teaching hospitals with nursing, maintenance, and administrative staff reflect a different set of demographics, and (4) land grant universities with agricultural extension agents reflect demographics dispersed across the respective state.

Academic Units

The number of academic units was defined as schools or colleges depending on whether the responding organization was a college or university, respectively. Academic units included the basic configurations of agriculture, business administration, education, engineering, liberal arts, and science. Medicine, law, veterinary science, and pharmacy constitute the various professional programs. Academic units focus on a specific discipline or logical groups of related disciplines, but, more importantly, they also represent specific materials and a range of services for their ongoing support. Some, such as business administration, education, law, and liberal arts, require minimal specialized infrastructure beyond general-purpose classrooms. Conversely, medicine, engineering, and science are not only unique, but also have highly unique subparts such as architecture, mechanical engineering, and pharmacology.

Campus Locations

While some representative IHEs had relatively few branch campus locations, others had an extensive system of campuses. These differed in size and organization. Some were extension centers with modest infrastructure requirements, often focusing on either just a few academic programs or a single research emphasis. Other branch campuses represent comprehensive freestanding colleges with individual requirements for athletic facilities, laboratories, housing and food services, and libraries. The smaller participating institutions had relatively few branch locations in comparison to the larger IHEs and were in close proximity to the main campus. In contrast, several larger IHEs had many locations scattered across their entire state.

Research-Oriented Versus Teaching-Oriented

Institutions with a teaching orientation tend to have fewer requirements for specialized infrastructure, equipment, and supplies than their research-oriented counterparts. Moreover, those with a research orientation are also more likely to encounter the demand for unique equipment and supplies associated with each new contract for sponsored research. As a consequence, procurement may have a higher proportion of non-recurring purchases from specialized suppliers that are likely to place a higher demand on procurement personnel's attention.

Public Versus Private Control

Whether an institution is under government or private control is an important factor for differences in procurement patterns. State-controlled institutions are frequently subject to acquisition regulations applicable for state agencies including: (1) bidding regulations, (2) small and minority-owned business participation quotas, (3) participation in state contracts

Table A.1: IHE Respondent Operating Characteristics

	Schools or Colleges	Campus Locations	Public or Private	Research Orientation	Professional Programs	Procurement Reports to
Univ A	6	**3**	Private			VP Business Services
Univ B	28	2	Public	X	X	VP Finance
Univ C	23	4	Public	X	X	VP Business Services
Univ D	5	2	Private	X		AVP Administration
Univ E	11	5	Public		X	VP Finance
Univ F	70	8	Public	X	X	VP Administration
Univ G	12	1	Private		X	VP Business Services
Univ H	18	2	Public	X	X	VP Business Affairs

for items such as motor vehicles, furniture, or services, (4) qualification of potential suppliers to participate in and compete for state business, and (5) definitions and planning cycles for the acquisition of capital items.

The numbers of campus locations, academic units, professional schools, and type of control have been summarized in Table A.1.

Guiding Assumptions

The following constituted the assumptions that guided our research:

- Universities differ by scope—specifically, number of students, faculty, and staff; number of campuses; and number of academic units. Academic units are generally referred to as schools and colleges.

- The type of institution, in other words, whether an institution is public or private, may have some bearing on how much control it has on its processes and how progressive its procurement processes may be.

- Universities differ by mission, and different missions drive different procurement practices. For example, universities focused on research—infrastructure-intensive science and engineering programs, medical schools, and other extensive research efforts—will have different demands placed on their procurement activities than those focused on teaching as the primary mission.

- Since there were only eight participating schools, the findings from this research cannot be universally generalized. To do so would be highly inductive.

- Procurement practices from other industries may be instructive in reengineering university procurement processes and for transforming the procurement mission.

Appendix II: Recommendations for Further Study

This study of university procurement used only eight participating schools as the basis for analysis. Despite a small sample, the intent at the outset was not to engage in research that would enable the positing of generalizations, but rather to establish an understanding of (1) what practices are currently employed, (2) how university procurement activities may differ, recognizing that there may be extenuating environmental circumstances that underlie differences in performance, and (3) whether or not universities are adopting best practices found in other industries as procurement shifts its paradigm from one based on transactions to one of strategic relationships. University procurement performance, at least amongst the participating schools, is a relative matter: The rankings established in this research are for such a small sample that there is no way of knowing that these eight are the best or the worst amongst a huge population of institutions of higher learning.

This research shows a decisive shift among the reporting schools toward driving procurement efficiencies and organizational effectiveness as noted in leading procurement organizations. From a policy and strategy standpoint, the participating schools are transitioning from transaction-based processing activities (processing requisitions, purchase orders, goods receipts, and invoice payments) to strategic activities of rationalizing or consolidating their supplier bases and building key supplier relationships. In order to do this, university procurement organizations are undertaking initiatives to reduce the heavy burden of day-to-day clerical effort that has historically consumed much of their own budgetary resources. The focus is in two areas, namely, application of information technology solutions primarily in the transaction and post-transaction phases, and recognition of the contributions possible from a

value-driven rather than transaction-driven procurement process.

Information technology is most often represented by e-procurement processes whereby the procurement function establishes supplier relationships and puts in place user-friendly (internal), customer-centric capabilities that include electronic catalogs, online requisitions and ordering, and automated invoice payment. All of this, however, needs to be facilitated in an environment where information technology also collects robust information on what goods and services are being procured, which specific operations of the university are procuring them, how much of the universities' funds are being expended, and with whom those funds are being spent. This all needs to be effected across a diverse range of goods and services required to support both research and educational roles.

For further study, it is recommended this research be expanded to include a greater number of institutions. A sample size of eight is useful for identifying and understanding how university procurement practices function; however, it is much too small to postulate generalizations or trends for all IHEs. In North America alone, IHEs number into the thousands. While the participating schools for this research offered a robust set of demographics—including size, teaching or research emphasis, range of campus locations, combinations of multiple academic units of varying descriptions, and private versus public control—there are other demographic variables to consider. For example, community colleges, typically institutions catering to local populations requiring curricula focused on the two-year degree, need to be included. In addition, we may learn much from studying the differences

between state-controlled institutions and munici-pal-controlled ones. Another difference may be religious-affiliated schools versus those that are secular. One issue is clear: Future research will need to incorporate a survey methodology with many more participants.

This research has also identified several issues that can be pursued with organizations in other industries. First, to what extent does procurement experience and training help an organization's ability to trans-form from a transactions-based firm to a strategic one? Second, how important is the implementation of information technology to organizational transfor-mation and supplier consolidation? Third, to what extent does spend analysis help a university, or any procurement function for that matter, successfully undertake procurement transformation? Is it a pre-requisite to transformation, or is it an outcome of the transformation process? Finally, how significant are various demographic factors in implementing and maintaining a comprehensive procurement policy?

Summarily, findings from this research can serve as a basis for conducting additional efforts with a much wider audience. There is potential interest in activi-ties of community colleges as well as those universi-ties under municipal control. Future research and analysis on how these procurement organizations are evolving, or being transformed, from transaction-based organizations to strategic-focused ones would be particularly insightful. How are procurement objectives changing over time? How are universities measuring procurement performance relative to the transformational process from transactional to strate-gic? Specifically, which occurred first—adopting a strategic rather than a tactical mind-set or setting appropriate performance measures? Was one a cata-lyst for the other? Future studies should also investi-gate the specific resources necessary for undertaking successful procurement transformation.

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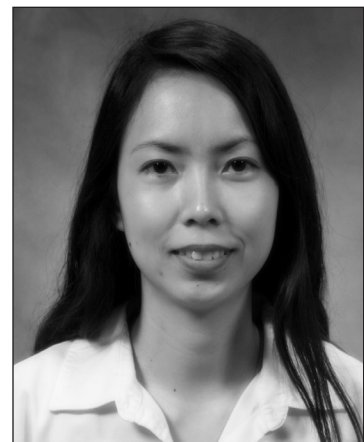
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