Benchmarking: Beyond Comparing Performance to Identifying Best Practices

Sergio Beretta, Andrea Dossi, Hugh Grove, and Tom Obremski

EXECUTIVE SUMMARY

- Most books, articles, and case studies about benchmarking in the past have focused on organizational processes, such as how to start a benchmarking project or how to manage exchange partnerships.
- This article presents a methodology for benchmarking that not only compares performance but also identifies the *conditions* for best practices (specifically, in the benchmarking of accounting processes).
- The methodology explained here was tested using an international benchmarking database developed in Italy called the *benchmarking clearinghouse project* (BCP).
- Discriminant analysis in the BCP database helps point to conditions relating to volume and complexity that relate to best practices in processing accounts receivable and accounts payable.
- Probabilities for correct classifications of the companies in the benchmarking database average 93 percent.

Benchmarking may lead to immediate improvements in operating performance; it can also lead to longer term improvements from reengineered business processes.

Companies that want to gain competitive advantage use *benchmarking* as a way to investigate best practices. Benchmarking may lead to immediate improvements in operating performance; it can also lead to longer-term improvements from reengineered business processes. But the lack of comparable data, some of it confidential, from other companies has been a nagging problem.

A FRAMEWORK FOR BENCHMARKING

One proposed framework for benchmarking research (based largely on literature from the United States) advocated research to answer the following questions:

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- Have benchmarking efforts (especially for ABM systems) been successful?
- If so, which variables are critical to success? (Elnathan et al., 1996)

This framework took into account a study of 24 benchmarking models (Institute of Management Accountants, 1995) and produced a generic five-stage benchmarking process (Spendolini, 1992). This framework suggests that an organization should do the following:

- Decide which attributes and operations will be benchmarked.
- Establish a benchmarking team.
- Identify partner companies for benchmarking.
- Analyze the organization and its activities, collect data, and establish goals.
- Take action concerning the goals of new practices, the scope of change, cost targets, and time tables.

Focus of Benchmarking Literature

Although the number of steps proposed in the literature may vary, the substance of the steps is usually the same. The framework chosen for this study summarizes the focus of the benchmarking literature as follows:

- **How to institute a benchmarking project.** *Antecedent* variables emphasize preliminary competitive analysis and establishment of a benchmarking team.
- **How to conduct the comparisons**. *Contextual* variables emphasize identification of the processes to be compared, collection and analysis of the data, and identification of benchmarking partners.
- **How to implement best practices.** *Outcome* variables emphasize reporting and analysis of the differences in performance and organizational action in order to assimilate the solutions identified.

Different forms of information gathering and sharing information require different ways of determining the effectiveness of benchmarking efforts (Elnathan et al., 1996). For example, a benchmarking study that relies on a database, as opposed to benchmarking directly with one or more partners (Coburn et al., 1995), should lessen the importance of selecting appropriate partners; the related costs and benefits should also differ markedly.

The benchmarking study described in this article developed an international database for benchmarking and elaborates essential variables of the framework described previously. Variables to provide comparability were added to address methodological issues such as the following that have generally been ignored:

- How to assess reliability in the process of performance comparisons.
- How to identify best practices.
- How to define the conditions for adoption of best practices.

THE BENCHMARKING CLEARINGHOUSE PROJECT

The continuing benchmarking project that began in 1994 at Bocconi University in Milan, Italy, is called the Benchmarking Clearinghouse Project (BCP). It is funded by the Centro Studi di Amministrazione e Direzione Aziendale (CESAD) of Università Commerciale L. Bocconi.

Participant Companies

The BCP began with the collaboration of 30 of the largest Italian and international companies operating in Italy. But the BCP has grown to include over 50 companies, including Agip Petroli, Alitalia, Ansaldo, Barilla, Ciba, Digital, Fiat, Hewlett-Packard, IBM, Italtel, 3M, Pirelli, Roche, Saipem, Siemens, Sip, and Snam. The participants for the study were limited to the largest Italian and international companies operating in Italy to ensure comparability of the data and also to make the study manageable.

The BCP has always viewed its participants as customers, so it involves them continuously in choices about benchmarking, measures, and analyses. For example, the participants agreed up-front to some common definitions for business processes and accounting measures. This involvement of the participants has proved fundamental to the credibility of the BCP model and the resulting benchmarking results.

Definition of Benchmarking Used

The BCP study relies on the following definition of benchmarking developed by the American Productivity and Quality Center:

> Benchmarking is a systematic and continual measurement process; a process of continuously measuring and comparing an organization's business against business process leaders anywhere in the world to gain information which will help the organization to improve its performance (Watson, 1993).

The long-term plan for the BCP is to benchmark business processes. As its first project, the BCP benchmarking database has collected and analyzed measures of accounting processes. (A similar strategy of providing accounting measures for business process evaluation has also been advocated in the United States.) (Ramanathan and Schaffer, 1995)

Benefits of Using a Database

As with the Hackett study in the United States cited previously, the BCP database exists for purposes of sharing information. In return for providing confidential data to the benchmark clearinghouse,

the participants received summarized and disguised information. Also, like the Hackett study, the BCP charged no user fees. The participants all expected a favorable cost–benefit result for their benchmarking efforts. Their costs were largely attributable to the costs of gathering data about the accounting and business processes studied.

The general goal of the BCP project was to provide the participants with a sound understanding of the reasons behind the performance gaps measured. Managers in those companies hoped to learn about the management practices of various companies in different industries and countries. They also wanted to find feasible targets for specific processes, so representatives from all the companies reviewed for reasonableness the variables to be tracked by the study.

Antecedent Variables

The benchmarking research framework shown in Exhibit 1 was used for the BCP. This framework uses three *antecedent* variables:

1. Preliminary competitive analysis.
2. Organizational commitment.
3. Prior benchmarking experience.

Participants in the BCP study conducted both internal and external competitive analyses. This required them to have the commitment of their organizations—and particularly of their top management—in advance. All the companies pledged unequivocally to participate in the BCP on a long-term basis. Their prior experience with benchmarking inclined all of them to favor the database approach that was central to the BCP study.

Contextual Variables

There are three *contextual* variables:

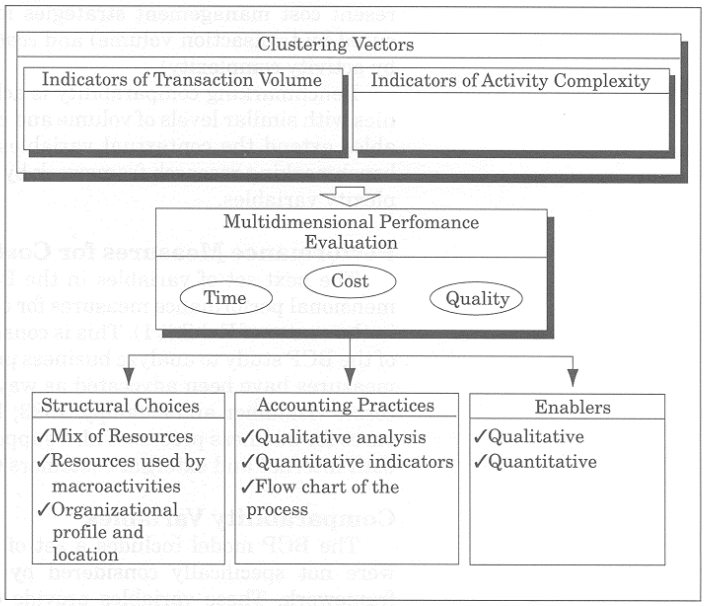
1. Scope and areas selected.
2. Information gathering and sharing.
3. Partners selected.

Outcome Variables

Participants helped choose outcome variables when the BCP study was first being planned. They chose nonfinancial *quantitative* measures for business processes, including *improved quality* (reduced error rates) and *faster cycle times*. As the participants gained experience, they also considered nonfinancial *qualitative* measures that they believed would help them understand their business processes and operations better.

The key financial measure used for analyzing business processes in the BCP study was cost; reducing cost was a major goal for the participants. To ensure comparability, the participants focused on *traceable* (out-of-pocket) costs. The participant companies decided that *nontraceable* costs (such as those caused by lost productivity, coordination problems, and other time delays) could be added later.

Exhibit 1. A Model for Benchmarking Accounting Processes



Major benefits the participants expected from the BCP study included:

- Reduced processing costs.
- Improved quality
- Reduced cycle time.

A First Step: Accounting Processes

The ultimate goal of the BCB study was to benchmark business processes, but the participants decided to begin by benchmarking accounting processes. The eventual goal was to benchmark business processes using key accounting process measures such as cost, quality, and time.

Exhibit 1 shows the model the BCP study used for benchmarking accounting processes. The goal is to provide a methodology that assesses comparability by describing the following:

- How to assess *reliability* in the process of performance comparisons.
- How to identify *best practices*.
- How to define *conditions for adoption of best practices*.

Economies of Scale and Variety

The BCP model starts with data-clustering variables that represent cost management strategies for *economy of scale* (as measured by transaction volume) and *economy of variety* (as measured by activity complexity).

Benchmarking comparability is achieved by focusing on companies with similar levels of volume and complexity. These cluster variables extend the contextual variables for partners selected in the benchmarking research framework by specifying both size and complexity variables.

Performance Measures for Cost, Time, and Quality

The next set of variables in the BCP model relates to multidimensional performance measures for cost, time, and quality (the box in the center of Exhibit 1). This is consistent with the long-term goal of the BCP study to analyze business processes. Similar performance measures have been advocated as ways to assess key business processes (Hammer and Champy, 1993; Lorino, 1992). Outcome measures for business processes also support the generation of value for both internal and external customers (Beretta and Dossi, 1994).

Comparability Variables

The BCP model includes a set of comparability variables that were not specifically considered by the benchmarking research framework. These variables provide comparability for the benchmark outcome variables.

The three types of comparability variables included in the BCP model (as shown at the bottom of Exhibit 1) include:

1. Structural choices.
2. Accounting practices.
3. Enablers.

Variables such as these have been advocated for process modeling (Greenwood and Reeve, 1994). Each kind of variable is explained in more detail below.

Structural Choice Variables

Structural choice variables relate to the choices companies make about *organizational structure* and *information systems architecture*. There are three major types of structural variables:

1. **Mix of resources**: The quality and quantity of resources employed. Particular attention is paid to human resources, information systems, and services acquired from outside the company (for example, because of the organization's strategies for automation and outsourcing).
2. **Resources used by macroactivities:** Resources absorbed by each of the macroactivities that compose the process (for example, the relative weights of checking, filing, recording, and closing ac-

tivities in the accounts receivable process and the accounts payable process). These variables should highlight how architectural choices and process design affect the resources used and thus the costs incurred.

3. **Organizational profile and location:** The location of the activities of the business or accounting processes (for example, whether the activities are inside the finance department or outsourced) helps establish key roles, responsibilities, and organizational connections.

Accounting Practice Variables

Accounting practice variables relate to qualitative and quantitative indicators in the accounting or business process. They should clearly highlight differences in the sequence of activities and in the nature and quality of the connections between them.

Qualitative and quantitative indicators should both highlight peaks; they should point out problems in the efficiency and reliability of the connections between activities in the accounting or business process. An example in the accounts payable process is the number of supplier claims about wrong payments, which could be used as an indicator of problems in the connections between the checking and recording activities.

Enablers

Enabler variables refer to the efficiency or functionality brought to the accounting process by other processes and external operating systems. They can be either *qualitative* or *quantitative* in nature.

For example, a well-managed customer database in the sales department increases the efficiency of the accounts receivable process. Consider also the importance of data from nonaccounting personnel for closings of the general ledger by a specified cutoff time. (Detailed examples of these comparability variables are provided and investigated in the empirical analyses of the accounts payable and the accounts receivable processes.)

Comparability

The BCP model extends the benchmark research framework by considering comparability issues for the following:

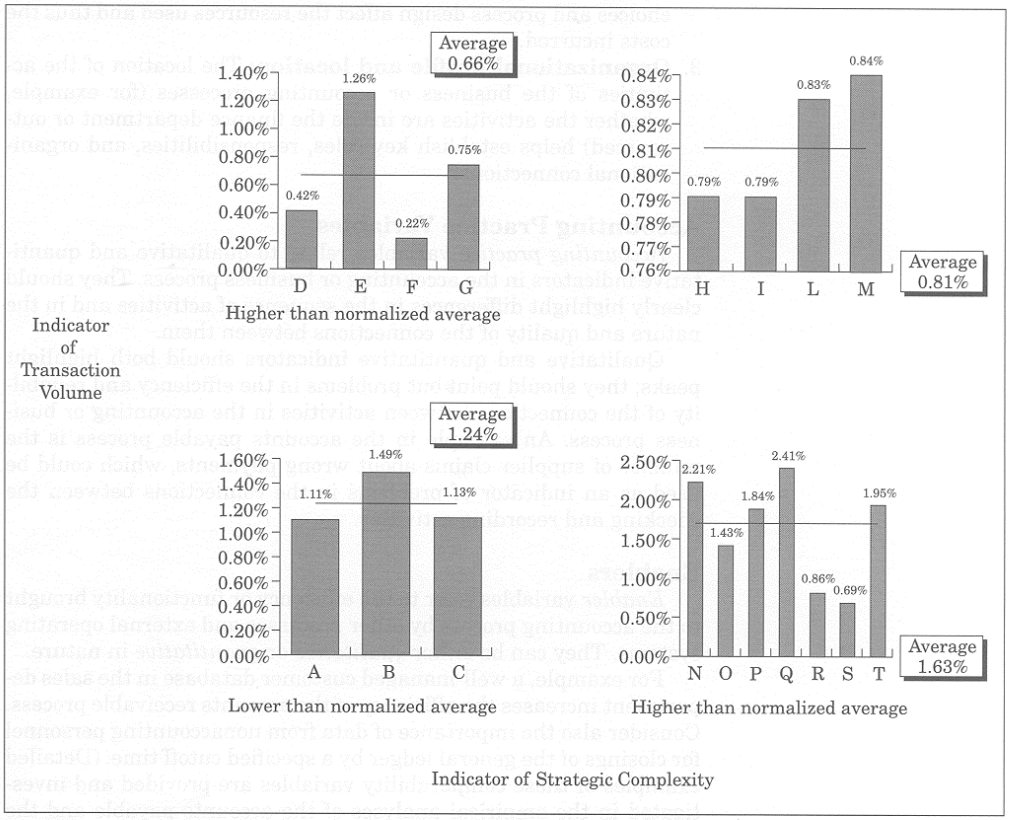
1. Size and complexity variables.
2. Structural choice, accounting practice, and enabler variables.

The BCP model provides a comprehensive analysis of benchmarking outcomes that goes beyond the initial identification of gaps in performance.

GENERAL EMPIRICAL APPROACH

The overall goal of the empirical analyses discussed in this article is to identify relationships or *correlations* among the cluster variables, the multidimensional performance variables, and the

Exhibit 2. Finance Department Costs to Company Sales



comparability variables. As a starting point (as illustrated in Exhibit 1), the BCP model posits that gaps in performance or operational efficiency relate to the following two cluster variables:

1. Transaction volume (for economy of scale).
2. Activity complexity (for economy of variety in process design).

To illustrate these two cluster variables with a general example, compare one general performance measure: the finance department's costs divided by the company's sales. Exhibit 2 shows the results for the 1994 data provided by 18 participating companies (which are labeled A, B, C, and so on through T).

Normalized averages were used to create the two-by-two matrix shown in Exhibit 2 and to classify each participating company. (Here the term "normalized" means standardizing data or making data

comparable.) For the transaction volume cluster variable (the vertical axis), the companies indicated that simply adding up all the various transactions of a finance department was not feasible. Instead, they chose to use a normalized measure of sales, number of customers, and number of suppliers.

For the complexity cluster variable (the horizontal axis), the companies contended that the variety of their transactions was largely attributable to the number of different product lines. They agreed to a normalized measure composed of the number of product lines multiplied by a diversity factor. The high-volume/low-complexity cell had the lowest overall cost, which reflects general strategies to reduce accounting process costs by centralizing and simplifying operations (Beretta et al., in press).

Comparisons with Comparable Companies

Traditionally, companies have compared themselves just to "best practice" or "world class" companies. A more meaningful or rigorous approach starts by comparing companies that belong to the same cluster or cell in a two-by-two matrix.

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Comparisons can be made with correlations of the cluster variables, the multidimensional performance variables, and the comparability variables in the BCP model. Detailed analyses for the accounts payable and accounts receivable processes illustrate this methodological approach for benchmarking comparability and make a useful starting point for process reengineering efforts.

For the BCP database, the participating companies provided detailed information about the actual costs and activities performed inside their own finance departments. They did not sort their data according to some ideal profile of costs and financial activities defined in advance. Such abstract data comparisons would not be useful for later accounting and business process reengineering, which was a major goal of the BCP study. The variables in the accounts receivable and accounts payable processes were compiled from the actual practices of the participating companies, then reviewed for comparability purposes by these same companies.

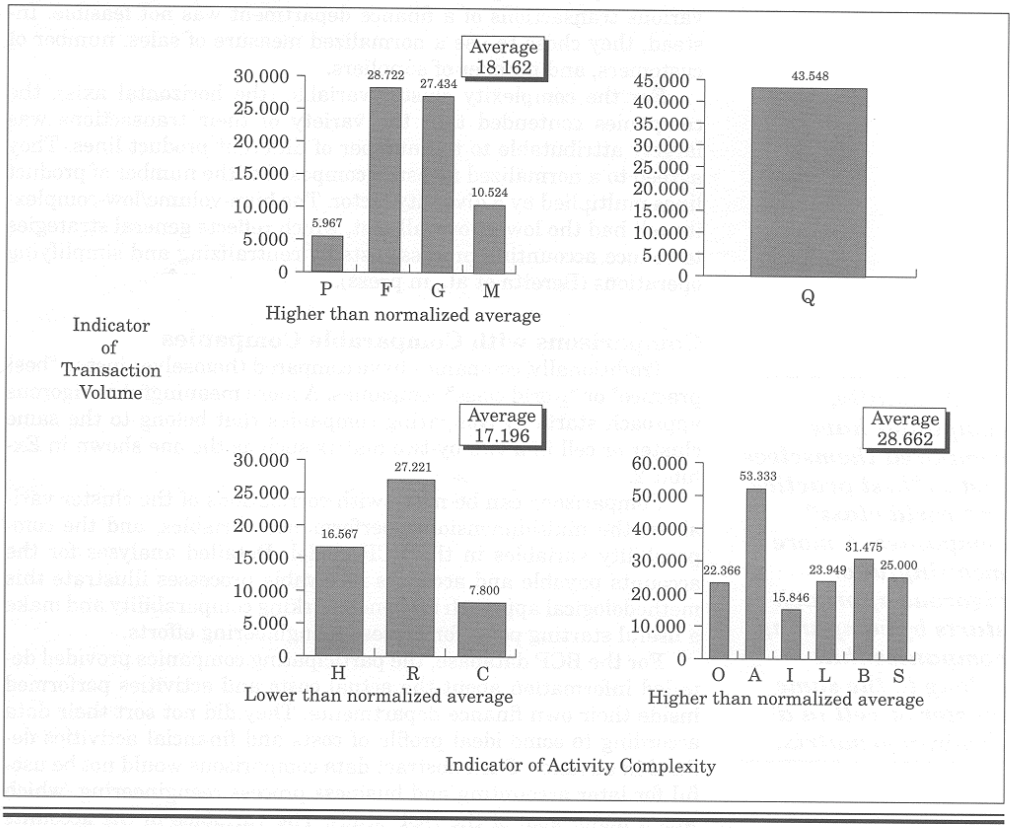
EMPIRICAL APPROACH: ACCOUNTS PAYABLE

For the cluster variables, the *volume of accounts payable transactions* was measured by means of a normalized measure of:

- The number of purchase invoices; and
- The average number of lines per invoice.

The *activity complexity* was measured by a single indicator: the percentage of foreign invoices to total invoices. The performance measure used was the average cost per purchase invoice processed. The results for the 1994 data provided by 14 participating companies appear in Exhibit 3.

Exhibit 3. Clustering Average Cost Per Purchase Invoice Processed (in Lira)



Both the high-volume/low-complexity cell and the low-volume/low-complexity cell had similarly low cost outcomes. Again, this result was consistent with the general strategies to reduce accounting process costs by centralizing and simplifying operations.

In accordance with the BCP model, initial best practices benchmarking can now be investigated with the various multidimensional performance and comparability variables. These comparisons should be made among companies within each of the four cells for more meaningful results.

The participating companies for the accounts payable process agreed to collect multidimensional performance and comparability variables (see Exhibit 4). The BCP model included multidimensional performance variables for cost, time, and quality, but also comparability variables (which were further classified into structural, accounting practice, and enabler comparability variables).

Exhibit 4. Accounts Payable Process Performance and Comparability Variables

Multidimensional Performance Variables

1. Average cost per invoice processed (see Exhibit 3)
2. Average number of invoices per headcount
3. Average cycle time: from the invoice receipt to the invoice/receiving report matching
4. Average cycle time: from the invoice receipt to its entry
5. Reliability of cycle time: deviations over 50% from average
6. Percentage of entry errors

Comparability Variables

Structural Choices:

A. Typology of resources employed:
   1. Total process cost per element (human resources, information system, and external services)
   2. Human resource cost (% of the total cycle cost)
   3. Information system cost (% of the total cycle cost)
   4. External services cost (% of the total cycle cost)
   5. Cost per headcount (total cost of the process/total full-time-equivalent employees of the process)

B. Typology of macro-activities:
   1. Total cycle cost per macro-activity
   2. Cost of filing activities (% of the total cycle cost)
   3. Cost of control activities (% of the total cycle cost)
   4. Cost of entry activities (% of the total cycle cost)
   5. Cost of closing activities (% of the total cycle cost)

C. Organizational profile and location:
   1. Percentage of the total person-days dedicated by the administrative function, other functions, and external services for each activity
   2. Ratio between human resources totally dedicated to the process and total full-time-equivalent employees
   3. Functions involved in the expenditure process activities

Accounting Practices:

1. Use of information technology in the filing activities (% of documents [invoices + bills] electronically filed on total number of documents related to the process)
2. Purchase order/bill of lading/invoice matching: use of automated systems (%)
3. Deviation causes from the standard procedure flow
4. Required information for the entry of an invoice
5. Manual research required for the entry of an invoice
6. Average number of controlled invoices per headcount

Enablers:

1. Percentage of invoices with no purchase order
2. Percentage of EDI invoices
3. Concentration of suppliers (number of suppliers as a % of the total number adding up to 80% of total annual purchases)
4. Number of debit/credit memos received/issued per 1000 invoices
5. Average number of packing lists per invoice
6. Average number of invoices per purchase order
7. Number of internal copies per invoice/debit/credit memo

Exhibit 5. Discriminant Analysis: Accounts Payable Process

Panel A: Volume Cluster Variable

Regression Statistics:

Multiple R	0.7368
Standard Error	0.4020
Observations	20

Variable:	Coefficient:	Standard Error:
Intercept	0.0332	0.60
X_1 = Invoices per headcount	0.0615	0.04
X_2 = Average cycle time	−0.0167	0.01
X_3 = HR cost as a percent of cycle cost	−0.0024	0.01
X_4 = Required information for an invoice	0.0299	0.02
X_5 = DR/CR memos per 1000 invoices	0.0102	0.01

Classification Rule:
Decide a company is a "1" (High Volume) if and only if:

$$0.0332 + 0.0615X_1 - 0.0167X_2 - 0.0024X_3 + 0.0299X_4 + 0.0102X_5 > .583$$

Probability of Correct Classification (PCC) for All Companies:
PCC = 18/20 = .90

Panel B: Complexity Cluster Variable

Regression Statistics:

Multiple R	0.6898
Standard Error	0.4127
Observations	20

Variable:	Coefficient:	Standard Error:
Intercept	0.2620	0.41
X_1 = Percentage of entry errors	−0.1037	0.08
X_2 = Cost per headcount	−0.0034	0.00
X_3 = Control as a percent of cycle cost	0.0053	0.01
X_4 = Manual research for invoice entry	0.0245	0.03
X_5 = Concentration of suppliers	0.0156	0.01

Classification Rule:
Decide a company is a "1" (High Volume) if and only if:

$$0.2620 - 0.1037X_1 - 0.0034X_2 + 0.0053X_3 + 0.0245X_4 + 0.0156X_5 > .452$$

Probability of Correct Classification (PCC) for All Companies:
PCC = 19/20 = .95

DISCRIMINANT ANALYSIS: ACCOUNTS PAYABLE

As Exhibit 5 shows, the BCP model used discriminant analysis to study the accounts payable process and analyze what would provide efficient and comparable benchmarking. The goal was to answer the following question: Could the multidimensional performance variables and the comparability variables *discriminate* (or *correlate with*) the cluster variables to distinguish the highs from the lows of volume and complexity?

As shown previously, the high-volume and low-complexity clusters both tended to have the lowest accounting processing costs. Thus, companies that wanted to use benchmarking to reduce their accounts payable processing costs could determine which multidimensional performance and comparability variables correlated with high-volume or low-complexity cluster variables. Armed with that information, the companies could identify partner companies for benchmarking and choose related key variables to investigate.

In the volume cluster variable (the first half of Exhibit 5), one discriminant analysis model correctly classified 90 percent (18 of 20) of the companies as being high- or low-volume. In the complexity cluster variable (the second half of Exhibit 5), another discriminant model correctly classified 95 percent (19 of 20) of the companies as being complex or not complex.

Independent Variables

There were five significant independent variables in each of the two discriminant analysis models, as the empirical results of Exhibit 5 show. These ten variables helped validate the BCP model because all the major types of variables were represented in the results. They included all three types of multidimensional performance variables (cost, time, and quality) and all three types of comparability variables (structural choice, accounting practice, and enabler). All of the ten variables appeared to have reasonable construct (or face) validity in correlating with high-volume or high-complexity companies.

The lesson from this model is that benchmarking must compare companies that are truly comparable. In other words, benchmarking must compare apples with apples and oranges with oranges. Five variables in the discriminant analysis of the accounts payable process shown in the two panels (A and B) of Exhibit 5 were correlated with each of the two cluster variables of *volume* and *complexity*. These results were composed of three *performance* variables: X_1 in Panel A (invoices per head count), X_2 in Panel A (average cycle time), and X_1 in Panel B (percentage of entry errors).

There were also seven *comparability* variables. Of these, three were *structural*: X_3 in Panel A (human resource cost as a percentage of cycle cost), X_2 in Panel B (cost per head count), and X_3 in Panel B (control as a percentage of cycle cost). Two other comparability variables had to do with *accounting practice*: X_4 in Panel A (required information for an invoice) and X_4 in Panel B (manual research for invoice entry). Finally, two of the comparability variables were *enablers*: X_5 in Panel A (DR/CR memos per 1,000 invoices) and X_5 in Panel B (concentration of suppliers). Thus, all major components of the BCP model for benchmarking were represented in this analysis.

CONCLUSIONS

This study attempts to capture interrelationships or correlations of cluster variables, multidimensional performance variables, and comparability variables to improve the benchmarking process beyond a cursory identification of best practices. This more extensive

benchmarking approach, which must include comparability variables, should reduce the risk of transferring best practices. The BCP approach should also help improve benchmarking efforts, because it makes the choice and the type of process design explicit. It is a starting point for transferring solutions inferred from benchmarking to one's own company.

The BCP study provides benchmarking information about both process performances ("how much" questions) and process operations ("how to" questions). The cost–benefit analysis appears to be cost-effective for the companies participating in the BCP study. They only have to provide the data described here to receive the benefits of the comprehensive and comparable benchmarking information provided.

The BCP model outlined in Exhibit 1 provides a guideline for collecting, summarizing, and analyzing benchmark information. In the discriminant analyses of the accounts payable process, all major components of the BCP model were represented. For each of the two cluster variables of volume and complexity, performance and comparability variables correlated with high-volume and high-complexity companies. The correlations included all three types of performance variables (cost, time, and quality) and all three types of comparability variables (structural, accounting practice, and enabler).

This initial empirical analysis does not attribute cause and effect. It merely correlates the two cluster variables (volume and complexity) with performance and comparability variables. The BCP data analyses in Exhibits 2 and 3 indicate that managers reduced accounting processing costs by centralizing (for economy of scale with high volume) and by simplifying (for economy of variety with less complex activities).

Companies that want to benchmark these best practices can start by studying the performance and comparability variables or the characteristics associated with high volume or low complexity. It would be naive to say that a company could become a low-cost provider of accounting services just by implementing or achieving all of these characteristics. However, these characteristics of best practices provide a good starting point for either improving operations in the short run or for reengineering processes in the long run.

As businesses become increasingly international and as more and more benchmarking databases become available, the use of benchmarking as a competitive tool for cost control, cycle time reduction, quality improvement, and process reengineering should continue to grow. Companies will discover that value enhancement for both internal and external customers is a key related benefit of effective benchmarking. ♦

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