

# **“THE TOOLKIT”**

## **TOOLS FOR BUSINESS PROCESS REDESIGN**

### **Introduction:**

Business Process Redesign (BPR) is a methodology firmly grounded in detailed facts derived from hard data, objective analyses, and customer input. In order to develop the facts pertaining to a business process, BPR Teams will utilize one or more of seven different “Tools.” The “Toolkit” will allow BPR Teams to do the following:

1. Focus first and always on customers—what do they want? Are they satisfied?
2. Thoroughly understand how work currently is done—the actual costs and steps employed.
3. Understand how employees spend their time.
4. Quantify costs or other hard data about a process—prove the need for change.
5. Identify problems and opportunities—where is the process inefficient? What are the causes of the inefficiencies?
6. Generate many promising improvement ideas.
7. Redesign the process.
8. Prioritize improvement efforts.
9. Estimate potential savings.
10. Get team members to think objectively—focus on the results that need to be achieved.

## The “Toolkit” Consists of the Following Seven Tools:

1. **Value-Added/Non-Value Added (VA/NVA) Analysis:** Distinguishes between activities that are essential from the customer’s perspective (i.e., have value) and those that are not essential to the customer and should be minimized over time. This analysis helps reduce complexity in a process and allows the redesign process to focus on what is really important to customers.
2. **Work Distribution Chart (WDC) Analysis:** Describes the staff time and costs expended on activities within a department or a process. Helps prioritize areas for improvement.
3. **Process Flowchart Analysis:** Creates a step-by-step diagram of how work is done in a particular process; tracks a wealth of data about that process, such as costs, time, delays, and errors. Helps analysts develop redesign ideas and provides a basis against which improvements can be measured.
4. **Cost of Quality (COQ) Analysis:** Categorizes and quantifies the cost of various types of non-value-added activities. COQ analysis is helpful in designing new approaches to ensure high quality in processes and in more accurately estimating potential savings. It is used with WDC analysis or process flowchart analysis.
5. **Volume Analysis:** Evaluates the different types and numbers of transactions that flow through a process and affect employee workload. Helps analysts with three aspects of redesign: determining types of special handling for transactions, appropriate approval requirements, and reasonability of employee workload.
6. **Benchmarking:** Compares the performance of one process to that of other processes within the same institution, other institutions, or even other companies outside higher education. This is one of the best ways to generate new ideas for process redesign and to prove the need for change.
7. **Customer Analysis:** Measures current customer satisfaction, identifies key areas for improvement, and identifies potential future customer needs.

The Chart on the following page provides an overview of where a particular tool might be utilized:

### Needs Which Each BPR Tool Can Fulfill

| BPR Tools<br>Needs                                               | Value-Added/Non-Value Added Analysis | Work Distribution Chart Analysis | Using a Process Flowchart | Cost of Quality Analysis | Volume Analysis | Benchmarking | Customer Analysis |
|------------------------------------------------------------------|--------------------------------------|----------------------------------|---------------------------|--------------------------|-----------------|--------------|-------------------|
| Understand how work currently is done                            |                                      | <b>X</b>                         | <b>X</b>                  | <b>X</b>                 | <b>X</b>        |              |                   |
| Understand Use of employee resources                             |                                      | <b>X</b>                         |                           |                          | <b>X</b>        |              |                   |
| Identify Process Complexity; Highlight Inefficiencies            | <b>X</b>                             | <b>X</b>                         | <b>X</b>                  | <b>X</b>                 | <b>X</b>        | <b>X</b>     | <b>X</b>          |
| Identify Opportunities; Generate improvement ideas               | <b>X</b>                             | <b>X</b>                         | <b>X</b>                  | <b>X</b>                 | <b>X</b>        | <b>X</b>     | <b>X</b>          |
| Quantify Time and costs                                          |                                      | <b>X</b>                         | <b>X</b>                  |                          |                 |              |                   |
| Estimate Potential Savings                                       | <b>X</b>                             | <b>X</b>                         | <b>X</b>                  | <b>X</b>                 |                 |              |                   |
| Stratify Transactions, Set Approval Structure, Evaluate workload |                                      |                                  |                           |                          | <b>X</b>        | <b>X</b>     |                   |
| Determine Customer Needs; What's Essential to the Process        | <b>X</b>                             |                                  |                           | <b>X</b>                 |                 | <b>X</b>     | <b>X</b>          |
| Prioritize Improvement Efforts                                   | <b>X</b>                             | <b>X</b>                         |                           | <b>X</b>                 |                 | <b>X</b>     | <b>X</b>          |
| Help BPR Team Members Think Objectively                          | <b>X</b>                             | <b>X</b>                         | <b>X</b>                  | <b>X</b>                 | <b>X</b>        | <b>X</b>     | <b>X</b>          |

## **Detailed Examination of the Tools for Business Process Redesign:**

This training manual is designed to educate team members on the tools that are recommended for use in Phase I of the BPR process.

The four tools that will be covered in this initial training program are;

1. Value-Added/Non-Value-Added Assessment
2. Flow Chart Analysis
3. Work Distribution Analysis
4. Customer Survey Analysis

The following information is detailed and includes step-by-step instructions for BPR Team Members to actually execute each tool.

### **1. Value-Added/Non-Value-Added Assessment:**

#### **Objectives and Overview:**

The Objective here is to separate the wheat from the chaff and leave only those activities that are essential to customers. VA/NVA assessment distinguishes between those activities in a process that are truly essential from the customer's perspective and those which are not essential to the customer and should be minimized or even eliminated from the process over time. VA/NVA assessment is one of the most important principles in redesigning processes to address true customer needs. VA/NVA concepts are discussed first because they underpin many of the remaining BPR tools. This type of analysis will always be joined with at least one other analysis tool. VA/NVA works well with a Process Flow Chart or a Work Distribution Chart each of which will be discussed in detail later.

## **Suggested Use and Application:**

VA/NVA principles can be applied in conjunction with other tools in at least three ways;

### Application

Activity analysis of a process, where discrete steps in a detailed process flow are classified as VA or NVA (used with either the Work Distribution Chart, Cost of Quality Analysis, or Process Flow Analysis Tools).

Activity analysis of an entire unit, where each activity in that unit's operation is classified as VA or NVA (used with the Work Distribution Chart or Cost of Quality Analysis Tools).

Customer Groups, Where Customers are asked to identify those services which are essential, nice but not essential, or optional (used with the Customer Analysis Tool).

### Distinguishing Results

Data will focus on the costs of the NVA activities which are part of a particular cross-functional process. Eventual cost savings will be achieved through cross-functional improvement efforts.

Data and analyses will focus on an entire unit. Costs and savings will be estimated based on the unit's internal improvement activities only, although ability to achieve improvements may rest with managers outside the particular unit.

Data will focus on the "out-puts" of a process, not the process itself nor the departments involved. Improvements will be achieved by changing the service or product mix (i.e., eliminating some old and / or instituting other new services or products).

## **How the BPR Team can determine if an activity adds value:**

VA/NVA is a quantitative tool that is used to make judgments about the value of activities in a work environment. VA/NVA becomes a powerful tool when used in conjunction with other quantitative BPR tools to support analyses.

By answering four questions BPR Teams can determine if an activity adds value to a process (VA) or does not add value to a process (NVA).

- i. Could this activity be eliminated if some prior activity were done differently or correctly?
- ii. Does technology exist that would eliminate this activity?
- iii. Could this activity be eliminated without affecting the form, use, or purpose of the final product or service from the customer's perspective?
- iv. Is this activity required by a customer, and will that customer pay for this activity?

## **Concluding Comments about VA/NVA:**

The focus of VA/NVA is to identify those few activities in a business process that are essential to the external customer. This also means identifying activities that do not add value. This does not mean that employees do not add value if they perform a non-value-added activity. Rather, the employee performing the NVA might better spend her or his time performing a value-added activity elsewhere in the process or institution.

**Example of Value-Added/Non-Value-Added Assessment Chart:** See; Exhibit: [A](#)

**Rationale for Value-Added versus Non-Value-Added Assessment:**

| <i>Box</i> | <i>Activity</i>      | <i>VA/<br/>NVA</i> | <i>Brief Rationale</i>                                                                                                                                                              |
|------------|----------------------|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A          | Receive Award Letter | VA                 | Award letter must be read and fed into the university's system. Data should be entered directly into system.                                                                        |
| B          |                      | NVA                | Already recorded once by hand                                                                                                                                                       |
| C          |                      | NVA                | This step may be necessary for internal control purposes, but it's not essential from the customer's perspective. Approvals may be necessary in some cases, but they're always NVA. |
| D          |                      | NVA                | This step may be necessary for internal control purposes, but it's not essential from the customer's perspective.                                                                   |
| E          |                      | NVA                | Unnecessary if automated system.                                                                                                                                                    |
| F          |                      | NVA                | Unnecessary if automated system, would update immediately                                                                                                                           |
| G          |                      | NVA                | Unnecessary to have this level of approval for all transaction types                                                                                                                |
| H          |                      | NVA                | Manual tracking system; unnecessary                                                                                                                                                 |
| I          |                      | NVA                | This step may be necessary for internal control purposes, but it's not essential from the customer's perspective.                                                                   |
| J          |                      | NVA                | Only one approval should be required.                                                                                                                                               |
| K          |                      | NVA                | Unnecessary with automated system.                                                                                                                                                  |
| L          |                      | NVA                | Unnecessary with automated system.                                                                                                                                                  |
| M          |                      | NVA                | Unnecessary with automated system. Controlling access to information, not the transaction itself.                                                                                   |
| N          |                      | NVA                | Unnecessary with automated system.                                                                                                                                                  |
| O          |                      | NVA                | Data entry should be done at the originating department level in lieu of typing a paper, carbon copy form. Then, this data entry step would be unnecessary.                         |

**2. Work Distribution Chart Analysis**

**Objectives and Overview:**

A work distribution chart (WDC) is an effective tool because it creates hard data and looks at work from a nontraditional perspective. Instead of evaluating the cost of a whole function or department, a WDC analysis considers the activities—the actual

work—that occur within that department or process. The analysis of these small building blocks is critical when reconfiguring work as part of redesign.

The objective of this tool is to identify the activities that comprise the process or unit and then estimate the corresponding time and dollars expended on each of these activities.

*Some examples of how WDC is utilized:*

- Identify the activities that comprise most of the work in a department or process;
- Quantify the cost of each activity, in terms of the cost of staff salaries and benefits;
- Help managers establish the priority of activities;
- Determine how employee time is allocated throughout a department or process;
- Generally assess overall productivity; and
- Begin to develop ideas for process improvement and better use of resources.

*The basic components of a WDC analysis include:*

- An “activity dictionary” that lists and briefly defines all activities so that employees report their data based on a common understanding of the defined activities.
- A data-collection form on which each employee allocates his or her time across the defined set of activities.
- A spreadsheet or relational database to analyze the employee responses.
- A set of questions to help analyze the data, interpret results, and generate ideas for redesign

### **Suggested Use and Application:**

A work distribution analysis can be applied in two ways:

#### Application

estimates her or his time allocated to the defined set of steps in that process.

1.) To an entire unit, where every employee in the unit (including management) allocates 100% of his or her time across the defined set of activities that make up that unit’s operations.

2.) To an entire process, where every employee involved with the process (regardless of her or his department)

### Distinguishing Results

In this instance, data and analyses will focus on an entire unit. Costs and savings will be estimated based on internal improvement activities within that unit only, although ability to achieve improvements may rest with managers outside the particular unit.

At this level, data will center on the costs of the particular cross-functional process. Cost savings will be achieved through collaborative, cross-functional improvement efforts

#### **Directions:**

The Steps listed below outline the procedures involved in completing a work distribution chart.

1. Identify and create a list of approximately 10 to 15 “major categories” for departmental activities.
  - Derive the list from interviews and from prior knowledge of the unit, identifying the key services for which the unit is responsible.
  - Some of the major categories should capture miscellaneous work activities, such as training, supervision, reporting, or internal communication.
  - *Example: “major categories”* for WDC activities for the Administration of a small college:

Accounting / Financial Services  
General Supervision and Management  
Computer Services and Support  
Direct Academic, Community, or Student Services  
Grants and Contracts Management  
Internal Communication

Payroll  
Personnel  
Planning  
Public Relations / External Communications  
Reporting  
Secretarial and Clerical Tasks

- Activities must be tailored to the needs of the unit. The analyst may choose to create a major category within a particular unit because of prior knowledge that the category is a potential trouble area.
2. Break out the discrete activities that fall into each of the major categories.
    - The list of discrete activities should be neither overly detailed nor too abstract.
    - As a guide, each major category should encompass roughly 5 to 12 discrete activities.
    - Some major categories can stand alone, with no discrete activities listed under the main heading, such as the “Gather Statistical Information” in the exhibit. Major categories stand alone if the category is a “catch all” for insignificant activities or the category is a potential trouble spot intended to isolate data for one particular troubling or time-consuming activity.

3. Briefly define each discrete activity to ensure common understanding and use of the activity terms.
  - These definitions comprise an activity dictionary.
  - Do not develop definitions for each of the 10 to 15 major category headers, unless it is a “stand alone” category.
  - **Example:** An “*activity dictionary*” for a small college’s administration<sup>1</sup>:

| <b><i>Accounting/Financial Services</i></b> |                                 |                                                                                                                                                                                                                                        |
|---------------------------------------------|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 110                                         | Budget Tracking                 | Track or manage over/under expenditures.                                                                                                                                                                                               |
| 115                                         | Budget Reporting                | Prepare budget reports. Create, maintain or provide support to the college’s accounting and budgeting systems. Manage, maintain, update, and generate reports from the General Ledger System.                                          |
| 120                                         | Purchasing                      | Purchase equipment and supplies, prepare requisitions. Administer contracts with vendors, professional service providers and others on behalf of college. Negotiate contracts with vendors, professional service providers and others. |
| 130                                         | Accounts Payable                | Manage, monitor, make entries to accounts payable system.                                                                                                                                                                              |
| 135                                         | Accounts Payable Adjustments    | Make adjustments to accounts payable system; resolve errors; resolve vendor complaints or discrepancies.                                                                                                                               |
| 140                                         | Accounts Receivable             | Manage, Monitor, and make entries or adjustments to accounts receivable system                                                                                                                                                         |
| 145                                         | Accounts Receivable Adjustments | Make adjustments to accounts receivable system; resolve errors, resolve customer complaints or discrepancies.                                                                                                                          |
| 150                                         | Petty Cash                      | Review, transmit, and comply with university regulations                                                                                                                                                                               |
| 160                                         | Travel Management               | Develop, interpret, or apply policies relating to travel authorization and reimbursement.                                                                                                                                              |

|     |                                    |                                                                                              |
|-----|------------------------------------|----------------------------------------------------------------------------------------------|
| 170 | Inventory, Equipment, and supplies | Conduct inventories of equipment and supplies                                                |
| 180 | Audits                             | Review and investigate procedures and systems to ensure the accuracy of information and data |
| 190 | Charts of accounts/standards       | Develop, revise, and advise on chart of accounts and financial reporting standards           |

| <b><i>General Supervision and Management</i></b> |                      |                                                                                                                                                 |
|--------------------------------------------------|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| 210                                              | Direct Supervision   | Plan, control, review, and verify work of employees reporting directly to you; complete employee performance evaluations.                       |
| 220                                              | Indirect Supervision | Plan, direct and control the work of people who do not report directly to you, but who provide support to the goals and objectives of your unit |
| 230                                              | Training             | Give or receive on-the-job training; attend professional development programs                                                                   |

<sup>1</sup> Reeder, Jefferson, *Business Process Redesign for Higher Education*, National Association of College and University Business Officers, 1994, p. 166

| <b><i>Computer Services and Support</i></b> |                     |                                                                                                                            |
|---------------------------------------------|---------------------|----------------------------------------------------------------------------------------------------------------------------|
| 310                                         | Technology Planning | Develop plans for the enhancement, maintenance, and use of technology; evaluate quality of existing systems and user needs |
| 320                                         | Computer Operations | Operate and maintain the computer system...                                                                                |
| 330                                         | ...                 | ...                                                                                                                        |
| 340                                         | ...                 | ...complete example found in <i>Business Process Redesign</i> , Id. at 167-170.                                            |

4. Develop a list of all employees, positions, salaries and benefit rates
5. Create a data-collection form and collect each employee's WDC data.
  - **3 Examples:** Cover letter; list of instructions; and data collection form. See; Exhibit: [B](#) Exhibit: [C](#) Exhibit: [D](#)
6. Enter, aggregate, and analyze data via a spreadsheet or database. The data analysis can be performed on either a standard spreadsheet or a relational database. A sample format for WDC Spreadsheet Analysis appears as Exhibit: [E](#) at the back of this document.

### **Interpreting the Results of WDC:**

WDC analysis does not point to solutions. Rather, the tool raises questions and points toward opportunities for improvement. Some of the major questions that might be answered through WDC are;

- Where should improvement efforts be focused? -- What areas or processes will yield the most significant and noticeable benefits from improvement because they currently take up so much time or are so fragmented? – What activities eat up staff time? – What are the costs (in salaries and benefits) associated with each major category or activity? Are the costs reasonable given the importance of the activity?
- Are too many employees performing the same work? – Greater centralization of responsibilities may facilitate work. – When several employees are assigned the same work, considerable time is lost through interruptions and changeovers.
- Are the employees productive?
- Are there misdirected efforts? – Is the time expended evenly matched to the importance of the activity? – Are the activities that take the most time really the most important ones?
- Are employee skills used effectively?
- Is the work evenly distributed?
- Is the work under or over specialized?

### **Concluding Comments on WDC:**

A WDC facilitates a BPR effort by quantifying the time and costs associated with activities in a process or functional area. It's a powerful tool that provides objective, quantitative data. The data help management not only to identify and prioritize improvement opportunities but also to begin to build a case for change with upper administration, employees, and cross-functional areas by estimating time, costs and potential savings associated with various activities. Over time the WDC process can be repeated to measure progress in an objective, consistent manner.

### **3. Process Flowchart Analysis**

#### **Objectives and Overview:**

To create a Process Flowchart, the analyst follows a transaction (Usually a piece of paper or a person) step-by-step to trace its path until the final output is created and delivered to the actual customer. The overall objective is to understand in great detail how work gets done. Data will be collected regarding the specific activities performed, inputs, outputs, resources, costs, and value-added versus non-value-added nature of the process. The data collected here may also be used later on to create an employee manual (once the redesign is complete). The following is a list of Detailed Objectives:

- Identify the sequence of activities necessary to complete the transaction
- Identify the number and purpose of all the people and departments involved in a process;
- Document these activities by creating a “map,” or diagram, that all parties understand and accept as the current process;
- Quantify the time and dollars expended on each of these activities and on the entire process
- Assess the value-added versus non-value-added nature of these activities to identify ways to eliminate waste, save money, and redesign the process

The Process Flowchart will generate an intimate understanding of the workflow. This allows the BPR team to eliminate unnecessary activities and generates improvement ideas. The goal is to strip away all but those steps essential for meeting customer expectations.

#### **Suggested Use and Application:**

Creating the process flowchart involves two key issues: i) cross-functionality and ii) level of detail. Cross-functionality means that the process is examined as it cuts across many departments within the institution, rather than examining the process within just one department. With regard to detail, the analyst can choose to document every discrete step in a process or describe a very high-level process by grouping sets of related activities. This decision will be dependent on the purpose of the flowchart exercise.

Below is an example of the application and results of a detailed flowchart and a high level flow chart:

### *Application*

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1.) Detailed: Creating a chart of an entire, cross-functional process, where every detailed step and every possible path are charted

2.) High Level: Creating a chart of an entire, cross-functional process, where detailed steps are grouped together to focus on the “macro,” most important activities of the process. All paths are not mapped; only those few paths that account for most of the transaction volume are followed and diagramed.

### *Distinguishing Results*

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This type of flowchart is needed for the detailed baseline and redesign phases of BPR. The detailed flowcharts should track all types of transactions that flow through the process. Costs and savings estimates based on the flowchart should be quite accurate. Estimates relating to non-value-added activities usually are precise and realistic..

The High-Level flowchart is used at the beginning of a BPR effort to estimate high-level costs and savings. When the flowchart techniques are applied to several different high-level processes, the data will help the BPR team and management select the processes for redesign that have the greatest potential for improvement and cost savings. Data will not be useful for actual redesign, as they do not focus on detailed transaction flows.

## Directions:

The directions that follow should be altered to suit the specific needs of the institution.

1. Begin by going into the departments where the work is actually done.
  - The analyst should “become” the transaction and should walk the entire process. It’s useless to complete a flowchart from a desk or otherwise outside the area where the work is actually done. The analyst should see the work and talk to the front line employees who know the work the best and can provide excellent information and improvement ideas.
2. Observe the first activity and the physical flow of the paperwork and / or product.
  - An example of a flowchart data-collection template that captures the flow and pertinent information about each activity is illustrated in Exhibit: F. This is a working-draft template that can be used later to create the final flowchart for presentation purposes. This form should be adapted to best suit the needs of the institution. Analysts will need to add forking paths above or below to illustrate the different routes for different types of transactions. Please take a moment to review Exhibit: [F](#)
  - Working with the selected, knowledgeable department personnel, note the following key data for each activity:
    - Source of the input
    - Typical minimum and maximum number of minutes an employee spends actually “touching” or working on the transaction in this activity. (touch time).
    - The minimum and maximum amount of days that the transaction may be delayed during this activity or between this activity and the next one (lag time). An example of lag time is the number of days a form sits on someone’s desk before it is actually picked up to be processed. Another example is the time a transaction spends in campus mail while going from one office to another.
    - The number of transactions (volume) that flow through this activity over a set period of time (usually one year).
    - Number of people who touch the transaction in this activity. This will almost always be “1,” unless the transaction undergoes a committee or joint review at some point.
    - If the process flow “forks” after this activity, note the percent of transactions that flow through each alternate path (must sum to 100%).
    - Output of the activity.
    - Recipient of the output.

- Exhibit G of Business Process Redesign includes an example of a working draft flowchart that has been completed using the template provided. The particular example is from the pay invoice portion of a cross-functional procurement process. See; Exhibit: [G](#)
3. By identifying the output and the recipient of the output for the first activity, the analyst identified the next activity in the chain of this process. Repeat step 2 until the final output of the process has been delivered to the external customer.
  4. Once the draft flowchart is completed, estimate the non-value-added (NVA) time, in increments of 25%, associated with each activity.
    - Make the NVA assessments away from department personnel.
    - Reference the value-added/non-value-added tool for specific examples of NVA activities.
    - If the flowchart is detailed down to the lowest level of activities, most NVA estimates will be 0 or 100%.
    - If the flowchart is high-level then greater judgment in assessing whole groups of activities will need to be employed. In this case many groups will be partially NVA but in most instances the assessments can be made in 25% increments.
    - Exhibit H (please see; Exhibit: [H](#)) presents a completed high-level flowchart for processing a personnel action form (PAF) that is used to change an employee's salary distribution at a medium-sized, public research university. Many of the boxes are shaded (representing NVA), indicating great potential for BPR and for increased use of technology.
  5. Enter, aggregate, and analyze process flow data via a spreadsheet.
    - The chart in exhibit I (please see; Exhibit:[I](#)) presents a sample format for a spreadsheet analysis. The activities and data presented correspond to the high level flowchart in exhibit H. For this discussion, columns are labeled A through N and rows are labeled 1 through 17, as noted on the chart.
    - Exhibit J (please see; Exhibit:[J](#)) presents the summary-level process flow data. The numbers are derived from the data in exhibit I.

### **Interpreting the Results:**

- While working with departments to document a process, the analyst should keep in mind the types of questions and approaches discussed below
- It is important to challenge the “process owner.” This is the person who has authority over the process and has the ability to implement changes. Analysts must not accept vague answers in justifications of an age-old process.
- The mapping exercise questions the current process and begins to generate redesign ideas. It may be helpful to bring the flowing list of questions as a reference during the interviews and working sessions.
- In considering these questions note the structure. Issues associated with work process are broken into the “M’s of Management” categories: Manufacturing, Manpower, Material, Marketing, and Management.

Manufacturing (the work process itself): These are the questions to be asked the employees, or “doers” themselves.

- How is the work done? Manually? Electronically? In duplicate? Triplicate?
- Does the process seem overly complicated? Can it be performed more easily?
- Does the activity duplicate, either in whole or in part, work performed in other steps or areas?
- Does the activity records information that has been or will be recorded elsewhere?
- Does the activity require the employee to make a substantial new study of the information?
- Can the activity be coordinated and/or combined with another? How?
- How many inspection, storage, or transport activities are there? Why?
- Are control steps incorporated into each process to prevent and/or detect and correct errors, thereby reducing the institution’s liability? What are these controls? What specific need does each one address?
- When would an error be caught if each control step were eliminated?
- What would be the cost of an error or lapse in control? Is the control cost justified?
- What are the error/reject rates? Why are transactions rejected or re-routed?
- What are the major bottlenecks/backlogs? Why?

Manpower (the staff members that do the work): These questions should be asked of both management and employees, who may offer different perspectives and insights.

- Who is doing the work?
- Does the worker have the right skill mix?
- Is the worker adequately trained?
- Can a more junior or less-skilled person perform the activity if trained?
- Who else, regardless of his or her unit, can perform the activity most easily and practically?

Materials (equipment, supplies, forms): These questions should be asked of both management and employees, who may offer different perspectives and insights

- Should different forms or supplies be used?
- Is the proper equipment available? What new or different equipment could help employees perform this process better?
- Can mechanical shortcuts be adopted?
- Does the unit have the technology it needs to perform this process?

Marketing (the customer): These questions should be asked of management, employees, and even customers, if possible.

- What is the purpose of this process from the customer’s perspective?
- Does the process fulfill the purpose?
- Has the unit communicated with its customers to ensure that the output is what the customers want?
- Has the unit communicated with its customers to determine priorities in output and opportunities for improvement?

- Is each activity essential to the final output for the customer?
- When and how does the customer interface with the process? – Should this be done earlier or later? – Should there be more or fewer interactions? – Should interactions be simplified? – Can the interactions be automated to speed processing and service delivery?

Management: These questions should be asked of the supervisors / managers and the employees themselves. Answers should be compared on a general, not individual, basis. Of course, questions should be phrased appropriately for each interviewee.

- Has management documented policies and procedures to help employees execute this process?
- Do specific institutional policies inhibit efficiency?
- Do employees have the proper responsibility, accountability, and authority? Are these linked in a manner that empowers employees to make appropriate actions?
- Is the work properly distributed among employees throughout the process?
- What systems are in place to measure output and performance in terms of quality and importance to the customer?
- Are performance measurements based on processes, teamwork, and customer satisfaction?
- Does management over-control or ignore the process?
- Do the conflicting goals of, or lack of communication among, area managers throughout this process inhibit efficiency?

### **Concluding Comments:**

Creating a process flowchart is one of the most frequently used tools in BRP. Flowcharts help analysts in three important ways: understanding the current process, generating ideas to redesign the process, and implementing the new process using a flowchart of the redesign. Developing the process map leads BPR team members to question why tasks are done the way they are done, and whether certain tasks should be done at all.

Overall, the fundamental purpose of this tool is to identify and then quantify activities, inputs, outputs, resources, costs, and VA/NVA tasks. In meeting this purpose, use of the process flowcharts not only becomes an integral part of the BPR process, it also establishes performance measurements to monitor the new process results going forward.

## **4. Cost of Quality Analysis**

### **Objectives and Overview**

The cost of quality is the total cost for not doing it right the first time. These costs include time and money spent on learning how to do it right, checking that it is right, or fixing the mistakes. COQ analysis is based on the same principles as VA/NVA assessment and is used to distinguish between those activities that are essential (from the customers perspective) and those that are not essential. COQ analysis is used in

conjunction with other tools. VA/NVA is a useful tool, COQ analysis is even more powerful because it classifies NVA activities as contributing to one of four types of costs: *Prevention; Appraisal; Internal Failures or; External Failures* (defined later). Using COQ analysis to build on VA/NVA assessment results in the following benefits:

- Types of NVA activities are more thoroughly understood, which focuses the BPR team more clearly on major, related topics for improvement;
- BPR teams can more clearly identify the potential reasons why poor quality occurs, or why a particular process is expensive;
- Savings can be more reliably estimated because estimates are developed for each COQ category, rather than all NVA activities as one group.

The objectives of both COQ and VA/NVA analyses are to identify waste and estimate savings and costs; COQ allows the BPR team to achieve these goals more thoroughly and accurately.

### **Suggested Use and Application:**

Like NVA assessment, COQ analysis is used in conjunction with work distribution analysis or process flowchart analysis, and can focus on the activities which comprise a process.

When do you employ COQ over NVA assessment? When applying a work distribution chart or process flowchart analysis at a high level it is unnecessary to use COQ analysis. When doing a detailed flowchart or work distribution analysis, activities will be listed in such detail that they naturally either will be value-added or will fall into one of the COQ categories of which there are four (4).

### **Directions:**

First complete the six (6) steps of the work distribution chart analysis. When creating the list of activities in step one (1) of the WDC procedures, ensure that all activities are either value-added or, if non-value-added, can be classified into only one of the following four COQ categories;

- i) **Prevention Costs:** These are the cost of preventing problems and eliminating errors at the source, including the costs of training and awareness programs, developing manuals or procedures, analyzing data, conducting customer workshops or special improvement projects, or planning quality efforts. This aspect of COQ is positive. Organizations typically do not spend enough time and money on these types of activities, which causes the other costs of quality to increase unnecessarily. As a department improves, the prevention costs typically increase while other costs of quality decrease.
- ii) **Appraisal Costs:** These encompass the cost of inspecting for errors or for inspecting the quality of the output, including proofreading,

- key verification, reconciliations, or vendor/third party audits. As a rule of thumb, usually 30 percent of these costs can be eliminated through process redesign.
- iii) **Internal Failure Costs:** The costs of redoing work, delays, requests for special handling, and other forms of waste, poor design, or redundant work. This may include error research and analysis, error corrections, document and data replacement, inspection, idle time, moving from one desk to another, batching forms for data entry, sorting, completing a summary document for a batch of forms for data entry, or any redundant steps. As a rule of thumb, usually 50% of these costs can be eliminated.
  - iv) **External Failure Costs:** The costs of any reworking after the “output” is delivered to the customer, including complaint investigation and response, adjustments, compensatory work, or formal investigations. As a rule of thumb, 100% of these costs should be eliminated.

The graphic in exhibit 23 (reproduced here as Exhibit:K) illustrates the desired progression of COQ as a department improves its operations and efficiency. Most organizations begin with an initial COQ of 20 to 40 percent of total expenditures, with the majority of costs stemming from internal failures. Effective organizations typically have costs of quality at or below 10 percent of total expenditures, and these costs of quality emphasize prevention.

Once steps 1-6 of WDC are complete, it is possible to take an extra step, or step seven (7), and classify each activity by COQ category and capture that activity’s cost in the appropriate COQ category.

As with the WDC analysis, COQ is analyzed through the use of a spreadsheet. The WDC spreadsheet is enhanced to include the COQ data which includes each activity’s costs in the appropriate COQ category.

The spreadsheet example in exhibit 24 (reproduced in the appendix as Exhibit: L) provides a method by which to categorize, calculate, and analyze COQ activity costs. The formulas for each cell are listed at the bottom of the exhibit.

### **Interpreting the Results:**

Consider the following questions in analyzing COQ data. The case studies in the next chapter present actual examples of applying COQ analysis, with sample charts and conclusions.

#### **Questions:**

- What percentages of staff time and costs are allocated to value-added versus non-value-added activities?
- What is the balance of costs among the four COQ categories?

- Does the institution need to shift the balance of quality control activities so that it spends more time on up-front error prevention, rather than on inspection or rework?
- Assuming, as a rule of thumb, that 100% of external failure costs, 50% of internal failure costs, and 30% of appraisal costs can be eliminated, what are the potential cost savings?

#### Prevention

- Given the costs of various prevention activities, are the programs effective?
- Does customer or employee feedback confirm the effectiveness and importance of efforts in this category?
- Given the other costs of quality throughout the operation, where should training be improved?
- What prevention programs can be developed to help reduce the greatest causes of COQ in appraisals, internal failures, or external failures?

#### Appraisals:

- What are the major types of appraisal costs? How many errors are there in each category over the course of a year?
- If there are numerous approvals, what purpose do they serve and how can they be reduced? – Were the approvals originally mandated by university policies that may need to be reevaluated?
- Were the approvals instituted in response to high error rates? Can the source of the errors be eliminated, rather than inspecting for error after the fact?
- Are the approvals historically just part of the process; this is, does anybody know or remember why the approvals are required?
- Do approvals link responsibility, authority, and accountability with the goal of minimizing the number of required approvals?
- Do the approvals control access to information, rather than identified risks? – Can distributed access to information systems eliminate the need for these approvals?
- Can technology be better employed to reduce the need for inspections and approvals?

#### Internal Failures

- What are the major types of internal failures? How many occurrences are there in each category over the course of a year?
- What causes these internal failures? How can they be eliminated?
- How can the operation be redesigned to eliminate the internal failures that seem to occur regularly as part of the “normal” process?

- Can employees be trained and empowered to complete a transaction from start to finish without passing the transaction down a “multi-stop production line?” Hand-offs increase error rate.
- Can technology be better utilized to reduce internal failures, such as moves, batching, coding, key-punching, filing, or sorting?

External Failures:

- What are the major types of external failures? How many occurrences are there in each category over the course of a year?
- What causes these failures? How can the process be redesigned to eliminate these failures?
- What are the repercussions within the university resulting from each external failure?
- What costs are expended to respond to each customer complaint / external failure (other than university staff time expended to address the problem)?

### **Concluding Comments:**

Combined with Work Distribution Chart (WDC) or Process Flowchart, Cost of Quality Analysis presents powerful data. It focuses the organization on the types of poor quality that are driving up costs. It also helps the institution realign its cost of quality expenditures to “do the activity right the first time.”

Ferretting out the hidden costs of quality in any organization is difficult because this type of data is not routinely collected. Establishing these costs requires careful review of how people spend their time and direct observation of how work is done. A word of caution: during the first few years that an organization performs CQA, the results may look progressively worse. This does not mean that the institution’s improvement effort is failing. The institution is simply becoming better at capturing the hidden information no costs of quality. This is progress, not backsliding.

Ultimately, however, the institution will reduce its overall costs of quality as processes are streamlined and COQ expenditures are strategically targeted in the prevention category.

## **5. Volume Analysis**

### **Objectives and Overview**

The objective of volume analysis is to understand the different types and numbers of transactions that flow through a process. Volume analysis is used to:

- Compare the number of transactions to the number of staff members over time to assess how workload might reasonably be changed in the future.

- Analyze the variety of transaction types and corresponding volumes in order to determine whether the process is overly segmented and specialized
- Compare the volume of transactions by type to the dollar value (or other exposure to risk) of those transactions to evaluate the necessity of the approvals required for the various transaction types
- Help determine the optimal approval requirements based on transaction types and exposure to risk
- Identify the transaction types that account for the bulk of the work volume and that therefore would yield the most benefit from improvement.
- Assess the effects on volume, workload, or processing resulting from changes in staffing levels, policies, procedures, or systems.

Volume analysis can be used to gain a deeper understanding of many aspects of a current process or to project effects of potential changes. Unlike the previous tools that drive broad redesign efforts, this tool allows the analyst to delve further into a particular issue, such as workload, approval structures, or processing options.

**Suggested Use and Application:**

Volume analysis can be applied two different ways. One approach to volume analysis focuses on the transactions, classifying them by different types and analyzing their volume through the process. The other approach to volume analysis focuses on transaction volume per employee thereby measuring workload over time.

Application

Distinguishing Results

By focusing on transaction types, volume analysis quantifies each transaction type through the process. Types can be determined by dollar value, priority, complexity, purpose, etc.

This method is effective for developing new approval structures and other institutional policies. It helps focus improvement efforts on the transactions that consume the most staff time.

The second approach to volume analysis focuses on transaction volume with respect to staffing levels over time as a measure of employee workload.

This helps to build a case for fundamental change in the process. At most institutions, volume analysis will show significantly increasing workloads over the last five to ten years.

More traditional operations improvement efforts typically focus on employee productivity, tightened work standards, daily performance reports, or other incremental efficiency improvements. BPR focuses on radical redesign of the processes and the way work is done. Once processes are rationalized and redesigned, staffing requirements should certainly decrease across the organization. However, BPR typically does not utilize strict volume and productivity measurements in order to determine specific staffing requirements.

## **Directions:**

Volume analysis can be applied in two ways: by analyzing the number of transactions that flow through specified categories or by analyzing transaction volumes as an indicator of workload. The directions for each type of analysis are described separately below, and each has its own “interpreting the results” section.

### **Analysis of the Volume of Transactions Within Specified Categories:**

1) Determine the criteria to differentiate among various transaction types.

- Many of higher education’s high-volume, “business” processes support financial transactions. Therefore, in many cases, transactions can be segmented by financial value. For instance, when analyzing a procurement process, the transactions (i.e., purchase orders) may be classified based on dollar value – less than \$300, between \$301 and \$1,000, between \$1,000 and \$2,500, and so on. These classifications should mimic the way transactions are actually segmented in the process. For instance, purchase orders under \$300 may be “quick orders.” Purchases over \$2,500 may require competitive written bids and therefore may demand different handling.

Other criteria used to segment transaction types may include priority, complexity, purpose, originating department, vendor type, type of student (undergraduate / graduate), school (business, engineering, law, etc.), year of the student (freshman, sophomore, etc), or type of employee (staff, faculty, union, etc.). The categories must be developed to meet the exact needs of each independent analysis.

2) Collect the volume data for each transaction type.

- The analyst needs to determine how many transactions occurred in each of the defined categories (usually over the course of a year). For instance, she or he needs to determine the number of purchase orders issued for less than \$300, as opposed to the other categories. Unfortunately, many institutions are data rich and information poor. Therefore, collecting transaction data according to specified categories (thus transforming mere data into meaningful information) may prove challenging. It is important to be creative both in source and method. For instance, the purchasing department may not have the information systems to track the number of purchase orders in specific dollar value categories: however, accounts payable may be able to list the number of checks cut by specified dollar value ranges, thereby providing similar, if not exactly perfect, information.
- In addition to using a variety of information sources, it is important to be flexible in data collection methods. One hundred percent sampling is not required. For instance, extrapolate data from one or a few departments to estimate the total transaction volume. Alternatively, create the data by physically observing a random sample of transactions and extrapolating to approximate the total annual volume. If necessary and reasonable, change the category types to better fit the available data. Absolute precision is not important—just reasonable approximations.

- 3) Correlate the transaction volumes to the “dollars” associated with each transaction type. \*\*\*To analyze transaction volumes, they must be compared against something. In this first case, transaction volumes are compared to the dollars associated with those transactions. Later the number of transactions is compared to staffing levels as a measure of workload. The term “dollars” can mean the dollar value of the transactions or, alternatively, the costs of processing those transactions.
- **Dollar Value of the Transactions:** In this case, using the same categories that were used to segment transaction types, identify the total dollar value of the transactions in each category. For instance, in accounts payable, one category might include checks between \$1,000 and \$5,000. There may be 4,796 checks cut in this category of the course of a year. The total dollar value of the 4,796 checks might be \$17, 719,000, dispersed to a wide range of vendors.
  - **Cost of Processing the Transactions:** In this case, again using the same categories for transaction types, the cost of processing one transaction of a particular type is multiplied by the number of transactions in that type over the course of a year. This multiplication product is the total annual costs, university wide, of processing all transactions of that type through the process.

With Both the volume data and the dollar data, it is possible to analyze the transactions and draw conclusions about the appropriate categories.

### **Interpreting the Results:**

- For purposes of analysis, the analyst should convert all data from absolute numbers in to percentages. For instance, instead of denoting that there are 4,796 transactions of type “A,” record that type “A” transactions account for 27% of the total transaction volume through the particular process. Furthermore, instead of recording that type A transactions, in aggregate, cost \$231,700 per year in staff processing dollars, record that the costs of processing type A transactions account for 47% of the total processing costs for all transactions (types A through G, hypothetically) that flow through this process. Lastly, calculate the \$17,719,000 that these checks represent as a percentage of the total dollars disbursed by the accounts payable department.
- Graph the results for comparison. The charts in exhibit 25 are samples of the types of graphs that can be created for this analysis. Each chart presents a different “cut” of the same process’ data using different boundaries for the transaction types, which are based on the dollar value of each individual transaction. The white bars show the percent of the total dollar value of all invoices which is composed of the invoices in each specified range. The shaded bars depict the percent of the total number of invoices which is composed of the invoices in the specified range. In this case, the invoice data was used to approximate purchase order activity, as purchase order data was unavailable. \*\*\*The left chart shows that 93 percent of the total invoices (and thus probably purchase orders as well) are less than \$900, yet these purchases account for just 11 percent of the total dollars expended. The chart indicates that this institution

may want to consider raising its quick order dollar limit from \$300 to at least \$900. This change would need to be accompanied by appropriate training of decentralized departmental staff, random audits, and meaningful, swift consequences in cases of abuse. The chart in Exhibit: M shows that if this institution raised its competitive bid requirement from the current \$2,500 to \$15,000, nearly three quarters of the dollars spent on purchases would still undergo a bid process. The \$15,000 limit may seem high to some institutions, but senior management may want to accept a calculated level of risk to simplify and reduce processing costs.

- The graphs in exhibit M can help to answer the following types of questions:
  - Are transactions appropriately segmented?
    - Do too many transactions fall into one category?
  - If yes, can the transactions be more appropriately segmented and balanced?
  - Can the processing in the high-volume categories be especially streamlined to ease workload?
    - For improved analysis, should categories be narrowed further?
    - Does the institution overspecialize transaction types? Can transactions be made more generic and therefore simpler to process?
  - Are approval levels appropriate?
    - Is the institution spending a disproportionate amount of staff costs controlling a low percentage of the total transactional dollar value?
    - If approval limits were relaxed, what additional total transactional dollar value would be exposed to increased risk?
    - What percentage of the total transactional dollar value needs to be controlled at the highest level, with the highest level of approval?
    - Conversely, what percentage of the total transactional dollar value can be subject to the lowest controls, with the lowest level of approval?
  - What transaction types consume the greatest staff resources?
    - How can the processing of this transaction type be simplified?

### **Volume Analysis of Employee Workload:**

This section presents an approach to analyzing changes in transaction volumes as an indicator of employee workload.

- 1) As explained above, determine the criteria to differentiate among various transaction types.
  - Transaction types can be aggregated into larger groups than in the previous analysis. For instance, it is not necessary to differentiate among purchase orders under \$300, between \$301 and \$600, between \$601 and \$900, etc., as was done in the previous exhibit. Simply differentiate among transactions that require significantly different processing time. For instance, distinguish between “quick” purchase orders (speed processing

under \$300); regular purchase orders (non-bid orders less than \$2,500); and purchase orders that require a written competitive bid (over \$2,500).

- 2) Collect the volume data for each transaction type over the designated time period.
  - Data should be collected for at least a five year period; 10 years is even better.
  - If over a 10-year period, data can be collected for every other year.
- 3) Collect data for the total number of FTE staff allocated to processing these transactions over the same time periods.
  - If possible, identify the number of FTE staff allocated to processing each type of transaction. Otherwise, use the total number of FTE employees who work on any type of transaction.
  - Collect the FTE staffing data from each department that touches the particular process and has staff members allocated to work on these transactions

### **Interpreting the Results:**

- Divide the transaction volumes by the FTE staffing numbers to determine the volume processed per employee. This figure is called “workload.”
- Graph the workload over time. Exhibit: N presents a sample graph created using volume analysis. In this case, transactions were segmented by the type of facilities-related work: custodial, grounds, or maintenance. Transactions corresponded to the total square footage or the acreage maintained by the employees. This type of graph is primarily used to help build a case for change. If the workload increases over time, the steepness of the slope will indicate how much the department is “hurting” in terms of increasing workload and backlog. Additionally, these graphs can help to answer the following types of questions:
  - For each process, what departments appear to be shouldering greater workloads?
  - Can workload be shifted to other departments that may have greater flexibility?
  - Are processing bottlenecks occurring in this department? Why?
  - Does workload swing dramatically up and down over time? Why?
  - Do inconsistent staffing levels cause processing issues?
  - Is volume seasonal? If so, can cross-training be implemented to improve the consistency of workload among departments and across transaction types?
  - Is there a gradual workload “creep” or decline? If so, is this planned or is it an accidental occurrence that could cause problems in the future?

These are just a few of the issues BPR teams should consider when evaluating volume with respect to workload. The particular operating context for the process will raise many other questions. One of the many benefits of using university staff members on BPR teams is that they usually are aware of extenuating circumstances and thus should be able to offer clear insight into these analyses.

## **Concluding Comments on Volume Analysis:**

Both types of volume analysis are based on straightforward data and simple analytical concepts, yet they contribute to a cogent argument for change. When combined with other tools, especially using process flowcharts and benchmarking, the data come to life and can be presented in easy to understand, visually appealing formats. Depending upon the application, the data provide insight on transaction “over-segmentation”; approval requirements; effects of staffing, policy, or technology changes; the resource-consuming transaction types; and the urgency of the need for change. Furthermore, this volume analysis is also appealing because, over time, it can be augmented with additional years of data without redoing the original data collection and analysis.

## **6. Benchmarking**

### **Objectives and Overview:**

Benchmarking is an ongoing, systematic process for measuring and comparing the work processes of one institution to those of other institutions. Benchmarking is a powerful tool that can be used to identify opportunities for improvement and to identify new ideas that others have proven to be successful and that may be adapted to improve operations. More specifically, benchmarking is used to:

- Measure and understand existing internal processes, functions, or operations.
- Identify other institutions, or even companies, for comparison (both within and outside higher education).
- Identify “Best-In-Class” performers from whom the institution can learn.
- Understand what results others have attained and how they have done so.
- Provide the basis for prioritizing opportunities for change, identifying those areas that would most benefit from redesign.
- Measure and understand improvements over time, with respect to initial internal measurements as well as other benchmarked institutions.
- Provide compelling evidence that change must occur, overcoming the natural resistance to change.

Most importantly, the ultimate objective of benchmarking is to generate action: some form of improvement and redesign. To benchmark, and to conduct BPR, is to explicitly decide that the organization is going to change.

### **Suggested Use and Application:**

Benchmarking can be applied in numerous ways under a variety of circumstances. To shape any benchmarking effort, management must first consider two decisions: the focus of benchmarking and the type of benchmarking.

### **Focus of Benchmarking:**

Benchmarking can focus on three aspects of any organization: outputs, processes, or strategic issues.

### Application

1) Outputs: Focuses on what a person or function does for the organization. Evaluates the services or products provided either to end-customers or to other parts of the organization

2) Processes: Focuses on how the services are delivered or the work is performed.

3) Strategic Issues: Focuses on the one-to-five-year plan for the organization. Evaluates goals, new projects, and new ventures.

### Distinguishing Results

Using this method, the analyst attempts to answer the question, “Are we doing the right things?” This focus will identify gaps in service capabilities as compared to customer’s expectations or peers’ performance.

This benchmarking attempts to answer the question, “Are we doing things right?” It targets processes for reduction or elimination that are using excessive resources with questionable value creation

This benchmarking focus can be used to gain information to prioritize competing projects and to establish an overall plan to meet customer needs in the long term.

Business Process Redesign (BPR) most frequently utilizes the first two categories of benchmarking (focusing on outputs and processes) to evaluate and redesign processes. These two categories of benchmarking are used because, in undertaking BPR, a college or university wants to ensure delivery of the right services (outputs) in the best way possible (processes).

BPR must also occur within the context of a strategic direction – the “vision” discussed in How to Begin BPR. Thus, to help shape an initial BPR effort, the institution may want also to benchmark strategic issues to stimulate ideas for new and innovative approaches to managing an institution.

**Type of Benchmarking:** In addition to determining the focus of the benchmarking effort, management must also choose among four types of benchmarking: internal, competitive, industry, and best-in-class. Each type is described below.

- **Internal:** Analysis of existing, internal practices within various department or divisions of the institution, looking for the best internal performance, and measuring current performance.\*\*\* This is the first step in a benchmarking effort. The organization examines and understands itself before looking outward. Many improvements can be achieved by;

- Challenging history and asking in regard to each activity: “Why do we do this?” And “Why do we do it in this manner?”
- Raising the performance levels of all internal processes to the level of the best internal process.
- Setting goals and measuring the internal improvements over time.
- **Competitive:** Analysis of and comparison to targeted data from a select few, direct competitors or peers.
  - Competitive benchmarking is the next level of benchmarking but still reflects a fairly narrow, although important, view of benchmarking. This type of benchmarking can help an institution identify and prioritize areas for future improvement efforts by identifying major gaps in performance as compared to a select group of peers.
- **Industry:** Analysis of and comparison to general trends across a much larger group of related institutions. Very closely parallels “competitive benchmarking” but implies a broader perspective.
  - More than simply prioritizing opportunities for improvement, this type of benchmarking can be used to establish performance improvement goals and to identify trends in the overall industry. This implies an expanded institutional goal to go beyond “being as good as the peers” by incorporating broad industry knowledge to implement cost-effective processes.
- **Best in Class:** Looks across multiple industries in search of new, innovative ways to conduct business, no matter what their source.
  - This is the ultimate goal of the benchmarking process. This type of benchmarking supports “quantum leaps” in performance improvements and will lead to the greatest long-run competitive advantage.

Benchmarking must always begin with an internal assessment to understand an institution’s own operations. An institution may choose to expand the initial internal assessment of one isolated process into a full-blown internal benchmarking analysis of the many other processes within the organization. Or, the institution may choose to assess internally the isolated process and then use any of the other three types of benchmarking for further analysis of the particular process. In this light several of the case studies also use competitive benchmarking. Higher education, as an industry, is relatively new to benchmarking and has historically collected data only from selected, closely related peers (competitive benchmarking).

### **Directions:**

As part of the improvement cycle, each benchmarking effort moves through a series of four phases, the steps of which are outlined in the summary below.

## Summary of Benchmarking Phases

### **Phase 1. Understand what is currently done internally**

- 1) Identify an area or problem for study
- 2) Create a benchmarking team
- 3) Conduct an internal assessment of existing process flows and performance measures; create a detailed list of performance drivers and constraints.
- 4) Define desired internal performance levels using an aggregation of existing “best practices” across the organization.
- 5) Identify areas where current performance is unsatisfactory
- 6) Fix the easy problems.

### **Phase 2. Obtain objective information about the performance of others**

- 1) Choose a benchmarking approach
- 2) Develop a questionnaire, interview document, or other data collection tool.
- 3) Identify candidate participants (organizations and people).
- 4) Solicit candidates.
- 5) Send data collection tool to participants.
- 6) Interview participants or conduct site visits.

### **Phase 3. Analyze benchmarking information to understand and establish performance goals**

- 1) Compare benchmarking data against original internal performance data and drivers; note similarities and differences for your institution and the benchmarking participants.
- 2) Classify and analyze the quantitative data.
- 3) Review qualitative data.
- 4) Confirm data and findings where needed.
- 5) Reanalyze the quantitative results in light of the anecdotal interview comments.

- 6) Develop a draft model of best practice for the area under study.
- 7) Send the basic data to all benchmarking participants.

### **Phase 4. Develop and implement an action plan to achieve those goals**

- 1) Establish and implementation team to supplement the benchmarking team
- 2) Measure internal operations against the proposed model.
- 3) Sort the identified performance gaps based on their importance to the overall strategic plan of the institution.
- 4) Prioritize performance gaps based on the institution’s strategy, the impact of the change on customer satisfaction, and cost versus ease of implementation.
- 5) Have the implementation team begin facilitating the change process by holding meetings in the affected groups, taking suggestions for developing an action plan, and encouraging active involvement.
- 6) Create clear objectives that will provide short-run signals of improvement to reinforce the change process and motivate behavior.
- 7) Establish measurements that reflect improvement, or failure to improve, on the key proposed model measures.
- 8) Communicate the results in a positive manner.
- 9) Work with affected groups to establish long-range plans for meeting or exceeding benchmarked best practices.
- 10) Reinforce, learn, and change on an ongoing basis.
- 11) Benchmark again to recalibrate best-in-class.

The most important aspects of each phase are discussed in detail here.

### *Phase 1: Understand Current Process*

An institution must first understand and measure how work is currently performed before comparing its performance to others. This process is often called “base-lining,” or taking a snapshot of the “as-is” operation. Evaluating current internal performance will help to identify the areas that seem the most deficient and the most likely to benefit from external benchmark comparisons and redesign. Undergoing this type of self-analysis can provide a form of learning in and of itself. Very seldom does an institution look at how it does its work in such detail. The heart of this phase is deciding what to measure, measuring it, and then identifying opportunities, as discussed below.

- In deciding what to measure in Phase 1 of benchmarking, early studies may be confined to the operations within a single department (vertical benchmarking). However, to achieve dramatic, broad results, BPR requires a cross-functional focus on a process that cuts across many departments (horizontal benchmarking). BPR focuses exclusively on these cross-functional processes; benchmarking efforts, as a complement to BPR, usually need to assume a horizontal perspective at a minimum, although vertical benchmarking can be useful as well. In most cases, horizontal benchmarking efforts analyze how the process is structured and accomplishes work, as well as measure the performance of certain aspects of the process (such as error rates, turnaround time, costs, etc.).
- To begin measurement in Phase 1, several of the tools already presented can help with the more complex aspects of self-assessment, including process flowcharts, non-value-added assessment, or volume analysis. In addition, Exhibit: O contains illustrative performance indicators that an institution may choose to measure. Please note that this is not a definitive list of benchmarks. Institutions will need to select the indicators relevant to their processes and will certainly need to enrich this list over time.
- In Phase I, the objective of identifying opportunities for improvement is not to lay blame on manager or employee, but rather to focus on improving that process so the entire organization can function more effectively. Again, the purpose of benchmarking is to engender action and improvement. This type of analysis can help similar internal processes function as efficiently as the “best” internal process. Rigorous challenging can open up communication lines, establish common procedures and interpretations, and rid the organization of “historical” processes—those which have “always been done,” even though there is no ostensible reason for carrying out these processes. The ultimate objective of this phase should be not only to identify weak spots but also to understand the drivers of the process—in other words, why do these weak spots exist and how can they be improved?

Completing the self-assessment and measurement in Phase I helps target areas for external benchmarking and structures the data-collection effort in the next phase.

### *Phase 2: Obtain Objective Information About the Performance of Other Institutions*

Benchmarking builds off existing sources of information that can be tapped in a number of ways. How data are actually collected in this phase will depend on an institution's objectives, the resources it can bring to bear on the effort, and how quickly it needs results. Most institutions employ a hybrid of approaches to benchmarking. Benchmark data can be obtained through existing data bases, surveys, or on-site walk-through visits. Each method of obtaining data offers specific advantages and drawbacks.

- **Existing Database:** NACUBO and Coopers & Lybrand jointly have led a landmark benchmarking effort in the higher education industry which documents nearly 600 benchmarks in 40 different functional areas. Currently in its third year, over 180 institutions participate in this annual survey-based benchmarking effort, where data are collected by the participating institutions and then “scrubbed” and reported by Coopers & Lybrand. Each participant receives a copy of the data results, which are presented by individual institution and summarized into six peer groups.
- **Customized Surveys:** Institutions can create their own tailored surveys to address specific issues and can administer them by mail, by telephone, or in person. The incentive for other institutions to participate is the shared peer data; therefore, do not ask for information that you are not willing to share. Personal interview can yield more accurate, current information, but this type of benchmarking will consume more time and money than mail or telephone surveys. The advantage to using surveys is the relative ease of obtaining the information; the disadvantage in this approach will be ensuring accuracy and “apples-to-apples” comparisons.
- **On-Site Walk Through Visits:** This is the most effective and most advanced form of benchmarking. This type of data collection will ensure the data applies directly to the issues at hand. Data collection will focus not only on performance measures but also on ideas, practices, and processes actually in place. This type of benchmarking also provides the clearest indicators of best practices, as the most knowledge is gained when using this method. This type of benchmarking requires a serious commitment of time and resources to the project, as well as a serious benchmarking partner with whom to exchange detailed information and on-site visits. On-site walk-through visits can be made somewhat less costly and more efficient by using existing databases and surveys to “jump start” the data collection process. Doing the homework of data collection prior to an on-site visit tends to make the entire effort more efficient.

### *Phase 3: Analyze Benchmarking Information to Understand and Establish Performance Goals*

This is the third phase in the overall approach to benchmarking. By this point, the institution has analyzed its own operations, collected data from other institutions, and is ready to synthesize its research efforts and draw conclusions. Two aspects of this phase are discussed below: defining similarities and differences among benchmarked institutions and classifying data.

- In Phase 3, benchmarking effectiveness is defined by the level of comparability between the benchmarking participants. If comparability is low, the usefulness of the data will also be low. The first step in analyzing the data, therefore, is to understand the similarities and differences among the participating institutions. Institutions that are different can still provide useful insights, but their practices have to be carefully evaluated and then adapted for feasible implementation at another institution.
- This does not mean, however, that the participants must be “peers” in the traditional sense of higher education peer groups. It does mean that the benchmarked processes should have similar goals and customer expectations/needs. Comparable volumes are also helpful.
- To classify data in Phase 3, each institution’s response to a particular question should be listed in a table along with the maximum, minimum, median, mean, standard deviation, and semi-interquartile range values. To be more visual, this same data could of course be presented in graphical format. The table in Exhibit: P is a sample from the report on the NACUBO / Coopers & Lybrand benchmarking survey. Significant trends can often be spotted this way. While more elaborate statistical approaches may look more “precise,” they can seldom be effectively used in a benchmarking study because the underlying sample size is simply too small. In addition, the aim of operational benchmarking is not statistical rigor or “auditable” results. Rather, benchmarking should provide a springboard for operations improvement, a starting point in the search for best practices.

Another effective analytical tool is a “scatter diagram,” which graphs potentially related benchmarks with one benchmark on the x-axis and a second on the y-axis. Exhibit: Q displays one analysis where a scatter diagram was used. The fact that the points fall roughly along a straight line potentially indicates a direct correlations between these tow benchmarks. In this case, the number of grants and contracts awards received at the institution per FTE in the sponsored research office was directly proportional to the number of grant or contract proposals that were reviewed and processed per FTE in this staff group. By analyzing a variety of scatter diagrams and exploring relationships among different aspects of performance, the analysts can understand what fundamental factors drive performance. It is these factors that are targeted during redesign.

- Many other techniques can, of course, be used to analyze the data. Each of these quantitative analyses should be coupled with the anecdotal and qualitative information gleaned from the survey and interview process. The results of the analyses should be general lists of those areas where;
  - The institution’s performance is above average;
  - Performance is approximately equal to the benchmarked institutions; and
  - The institution’s performance is substandard.

#### *Phase 4: Prepare and Implement an Action Plan to Achieve Established Performance Goals*

The ultimate goal of the benchmarking effort is to generate action. After data collection and analysis are complete, it is time to turn the team's attention to implementation. The benchmarking analysis should be combined with several other BPR tools that have already been presented to redesign and implement new processes.

With the analysis complete and the improvements proposed, the real work begins. The hardest part will be actually changing the way the institution works. The critical success factors in implementation will be effectively addressing people issues as emphasized throughout the "change management" sections of chapter II. Communication channels, performance measures, and organization objectives sometimes must be radically changed, along with the actual business processes, to maintain consistency with BPR principles and redesign.

#### **Concluding Comments**

Benchmarking, whether used as a stand alone program or as part of BPR or TQM, requires the same dedication to continuous evaluation and improvement. Simply stated, the goals are to understand current performance, compare it to others, improve it, and then repeat the cycle. Two key points emerge from these goals. First, the internal analysis phase cannot be overlooked. It is absolutely critical for the institution to understand its own operations and to begin to improve the obvious, before looking outside for better practices. The internal assessment of one or a few areas may progress into a comprehensive internal benchmarking study.

Second, while implementation is always difficult, the quantitative aspects of benchmarking and BPR give the institution's change agent an added advantage over more traditional change methods. The objective, verifiable nature of benchmarking and BPR results may lead to discomfort, but nevertheless cannot be discredited. The facts speak loudly for themselves as a powerful voice for change.

#### **7. Customer Analysis**

Meeting customer needs is the crux of BPR. Thus, customer analysis is an important tool in charting the course for BPR and targeting specific areas for improvement. Specifically, customer analysis can be used to:

- Understand customer needs, expectations, and priorities.
- Understand overall customer satisfaction with current services or products.
- Understand customer satisfaction with specific attributes of services or products.
- Identify desirable services not currently provided.
- Help prioritize improvement efforts.
- Measure changes in customer satisfaction over time.

In the late 1980's, businesses began to recognize the vital importance of their customers and to incorporate the "voice of the customer" into every aspect of business,

including: strategy, operations, marketing, and human resources. The call to focus on customers now beckons to higher education—and it’s an important one to heed. Studies from the United States Office of Consumer Affairs found the following:

- The average organization never hears from 96 percent of its unhappy customers. For every complaint received, the average company in fact has 26 customers with complaints, 6 of which are serious problems.
- The average customer who has a complaint tells 9 other people about it, and 13 percent of customers who have a complaint discuss it with more than 20 people.

Using benchmarking to meet customer needs can help BPR team obtain and introduce the “voice of the customer” into core operations and processes.

### **Suggested Use and Application**

As part of BPR, customer analysis is generally applied in three ways; establish context of detailed measurement efforts, establish customer satisfaction and priorities, and measure ongoing process performance.

#### Application

The first goal is to establish the context of an improvement effort and identify the particular topics of factors the effort should address, usually through group discussions or individual interviews.

The second goal is to obtain specific information on customer needs, expectations, current satisfaction, priorities, and ideas for improvement (usually telephone surveys, written surveys, or interviews).

The third goal is to measure the ongoing changes in process performance from the customer’s perspective, usually written surveys or internal process measurements).

#### Distinguishing Results

This effort will be “exploratory research” with mostly qualitative results that are useful in conjunction with other quantitative measurement programs. This type of customer analysis can answer questions such as, “Are our customers generally satisfied?” “Where do they see opportunities for improvement overall? Where should we start first?”

This will be the core of the analysis effort, featuring both quantitative and qualitative results, which should help management establish improvement priorities, plans, and measurement programs.

These quantitative measurements will help management and employees measure progress over time and ensure that customer requirements are continually and appropriately addressed.

## **Directions**

This section details a customer analysis program which is effective for use in business process redesign. Many corporations have developed far more comprehensive customer programs with demonstrable success.

### *Establish the Context for a Customer Measurement Program*

Using group discussions or individual interviews, gather overall performance information from internal and external customers, management, and employees.

Group discussions of six to ten people should be led by an experienced facilitator with a specific agenda to explore particular issues. The agenda should serve as a guide, rather than a rigid schedule, as each group will have its own “personality” and will naturally focus on some issues more than others.

A reasonably small number of individual interviews should also be conducted, primarily with important customers and senior management, to discuss overall customer expectations, satisfaction, factors influencing satisfaction, and priorities. A structured interview guide should be developed to help the interviewer direct the discussion.

The greatest benefit of both of these techniques is the face-to-face interaction with customers, which allows for clarification of certain points, assessment of body language, and discussion of important topics not necessarily identified for the agenda. This background, discussion-based research builds the foundation for more intensive databased research in the next step.

### *Plan the Customer Research Effort*

To plan the customer analysis, the analyst will need to decide who to survey and the size of the survey sample.

BPR focuses first on the needs of the external customer (such as students, parents, faculty, granting agencies, the local community), and thus research should certainly target any group which may include current, former, or even potential customers. Many business processes in higher education specifically exist to serve internal customers who are employees of other administrative units.

Surveying internal customers is also an essential component to customer research. Finally, the BPR team may want to consider surveying employees who are part of the process to learn their opinions regarding working conditions, process efficiencies, management, and so on. Of course, each of these three groups would probably require a different survey instrument, addressing their relevant concerns.

For BPR, surveys are typically based on a random sample, but the team may also develop a “stratified” random sample that targets a specific number of responses for each major type of customer. For example, the BPR team may want to distinguish between management and staff responses for a particular survey. According to statistical theory, 30 responses are required for statistical validity, but at least 100 responses are recommended to build a solid case for change.

## **Design the Data-Collection Instrument**

In the previous step, the analyst determined the recipients and the scope of the survey. In this step, the analyst determines how and what to ask. The research tool itself may take on many shapes and forms, from a simple customer comment card to a detailed survey administered in person, by mail, or by telephone. However, each instrument should be designed according to the basic principles outlined in the example below.

### *Example*

#### **Ingredients for Success in Designing a Research Tool To Solicit Customer Satisfaction Information**

1. It should focus on customer expectations and on customer perceptions, not on what the company thinks it is delivering.
2. It should focus on the quality of the product or service, not on laying blame on an individual or group
3. Employees must be involved in developing the customer satisfaction measures, so that measures will be more relevant to their day-to-day jobs. This will lead to greater employee acceptance of the metrics; furthermore, staff-developed standards are usually more demanding than the ones management would recommend.
4. Both Qualitative and quantitative data should be gathered. The specific comments help to explain the numbers.
5. Questions in the survey or interview should be specific; and, if the research is to be carried out along with other work activities, it must be easy to collect and understand.
6. The research instrument should be designed so that management and/or employees can take action or implement change based on its results. Without priorities, there is no basis for determining what to fix first.
7. Finally, rewards for making positive changes based on the results of a survey should be visible and valuable.

The next example presents a framework for the subject matter typically addressed in a questionnaire. Within this framework, BPR analysts should incorporate the basic concerns articulated by management, employees, and customers into the survey. Additionally, analysts must be sure to include a range of questions that prompt both quantitative and qualitative responses. Ratings scales (1 to 10, 1 to 5, poor to excellent, always / sometimes / never, etc.) also should be added, usually with respect to those questions that measure either satisfaction, quality, or cost.

*Example*  
**Information Questionnaire Should Request from Customers**

- An overall evaluation of their satisfaction level
- An indication of their needs and expectation with respect to the category of products or services that the company provides
- An evaluation of the company's performance against these expectations
- An indication of any specific problems or complaints they might have
- Customer classification information, which will allow the researchers to analyze the customer responses by subgroups after all the data have been collected

After a draft has been developed, it is wise to ask for review and comments from a limited number of managers, employees, or customers before issuing the final survey. Don't skip this review cycle as information received will prove valuable. Exhibit: [R](#) contains two sample surveys developed by BPR teams at a state university for the solicitation of high-level customer feedback. Please note that each BPR team must develop a survey that meets its own specific needs in terms of content, style, and format, rather than simply adopting a survey from another institution.

One of the goals of the BPR team should be to develop a customer-satisfaction measurement system that is repeatable over time. This program will build on the initial survey effort and should include future written or telephone surveys. In addition, the team should identify "in-process" measurements that contribute to customer satisfaction, such as turnaround time to process a form, number of times the phone rings before being answered, and so on. These process measurements are just as important as surveys in quantifying customer satisfaction and performance improvement.

### **Interpret Results**

Depending on the number and complexity of responses, results are analyzed via a spreadsheet or database using standard statistical theory, including mean, frequency distribution, standard deviation, etc. The chart in Exhibit: [S](#) presents a sample analysis derived from a customer service survey on course scheduling and registration. A spreadsheet was used to enter and calculate results. Graphs were then created to make the results more easily and visually understood. Another way to analyze results is to use a particularly helpful tool for customer analysis called the "opportunity map" presented in Exhibit [T](#).

By asking customers to rate the importance of several attributes and then to also rate their current satisfaction with respect to these attributes, the BPR team can begin to evaluate and prioritize improvement opportunities. As indicated in exhibit: T, items that fall into or closest to the upper left quadrant require immediate attention from the BPR team. Exhibit U presents a sample of a completed opportunity map which was derived from the results of the sample survey reproduced in exhibit R.

### **Concluding Comments**

BPR can help colleges and universities reach their ultimate goal of improving value for customers. The tool presented in this section will help employees and managers understand what value specifically means to customers, paving the way for processes that more effectively and efficiently meet the customer's needs.

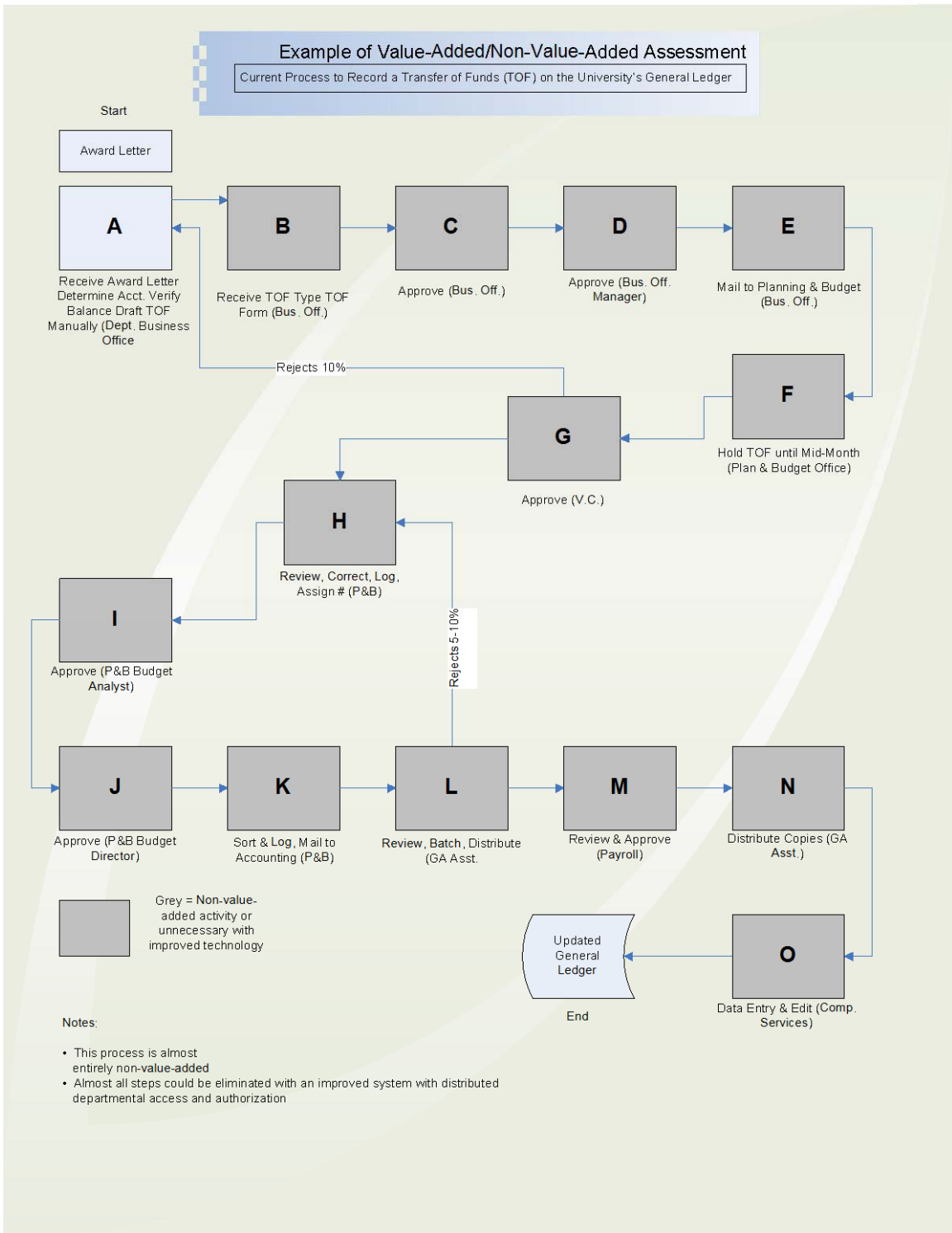
## INDEX OF EXHIBITS

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A



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B

**Sample Cover Letter for Work Distribution Survey**

Date: October 4, 2005

To: Montana State University Human Resources Department Employees

From: Business Process Redesign Team

Re: Business Process Reengineering—Attached Survey

In my memo dated \_\_\_\_\_, I alerted you that a survey would be distributed as part of the current Business Process Redesign initiative. Enclosed, please find that survey, including instructions, an activity dictionary, and a data collection form for you to complete and return.

This survey will help Montana State University to understand, for the first time, the actual and specific resources which support each of our administrative services and activities. Understanding these resources, both quantitatively and qualitatively, is absolutely critical to any future redesign efforts. We must understand our current operating environment and must be able to measure changes and improvements over time.

I hope this survey is not too burdensome. As an estimate, it will likely require about 30 minutes of your time. I understand that you and your staff are operating under increased workloads. Your additional efforts on this BPR initiative will help us to reduce some of that workload in the future. The BPR project is operating under a very aggressive schedule; it is essential to complete and return the survey to Administration and Finance, Montana Hall Room 201 by 4pm on October 28, 2005.

I appreciate your contribution in completing these surveys and supporting the BPR improvement process.

Sincerely,

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C

**Sample Instructions for Completing the Work Distribution Data Collection Form**

**Instructions for Completing the  
Work Distribution Data Collection Form**

Completing the attached form should take approximately 30 minutes of your time. If you have any questions about the directions, please feel free to contact Brian Driscoll at Ext. 1266. Please return your completed form to Administration and Finance no later than October 28, 2005.

**Purpose:**

A work distribution analysis helps to quantify information about an organization or function. It can objectively focus attention on the most important activities which take up the most employee time and therefore might yield the greatest benefit from improvement efforts.

**Who Should Complete the Work Distribution Data Collection Form?**

Every employee in Montana State University's Human Resources Department should complete her/his own form. It is important to receive 100% response rate to complete the data analysis.

**How to Complete the Data Collection Form:**

1. Begin by reading through the attached "Activity Dictionary" to familiarize yourself with the overall list of activities/responsibilities.
2. Identify the activities or responsibilities which account for significant portions of your time (at least 5 percent) over the course of a year. Please select no more than 20 activities/responsibilities from the list.
3. List the activities/responsibilities you have chosen on the Data Collection Form, along with the corresponding 3 digit activity code.
4. Go down the far right column of the Data Collection Form, allocating your time in percentages across the list of activities/responsibilities. Remember—you're your best estimates are what we are looking for.
5. Please be sure that the percentages for your activities add up to 100% when you are through.

**Please return your completed form to Administration / Finance: Montana Hall; Rm. 201 no later than 4pm on October 28, 2005.**

D

**Sample Work Distribution Chart Data Collection Form**

**Work Distribution Chart  
Data Collection Form**

Name: \_\_\_\_\_ Dept.: \_\_\_\_\_  
Job Title: \_\_\_\_\_ Phone Number: \_\_\_\_\_  
Supervisor's Name and Title: \_\_\_\_\_

- Thank you in advance for taking 15 to 30 minutes to complete this form.
- A response rate of 100% of all Human Resources employees is critical to the data analysis.

|                         | <b>Activity Code</b> | <b>Responsibility / Activity</b> | <b>% of Your Time</b> |
|-------------------------|----------------------|----------------------------------|-----------------------|
| 1                       |                      |                                  |                       |
| 2                       |                      |                                  |                       |
| 3                       |                      |                                  |                       |
| 4                       |                      |                                  |                       |
| 5                       |                      |                                  |                       |
| 6                       |                      |                                  |                       |
| 7                       |                      |                                  |                       |
| 8                       |                      |                                  |                       |
| 9                       |                      |                                  |                       |
| 10                      |                      |                                  |                       |
| 11                      |                      |                                  |                       |
| 12                      |                      |                                  |                       |
| 13                      |                      |                                  |                       |
| 14                      |                      |                                  |                       |
| 15                      |                      |                                  |                       |
| 16                      |                      |                                  |                       |
| 17                      |                      |                                  |                       |
| 18                      |                      |                                  |                       |
| 19                      |                      |                                  |                       |
| 20                      |                      |                                  |                       |
| Total (must equal 100%) |                      |                                  |                       |

Please select the corresponding box for the highest level of formal education you have received.

- High School                       GED                                       Associate's  
 Master's                               Bachelor's                               Doctorate

*Please return this form to Admin./Finance; Montana Hall, Rm. 201 by Oct. 28, 2005*

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E Sample Format for WDC Spreadsheet Analysis (photocopied from pg. 52)

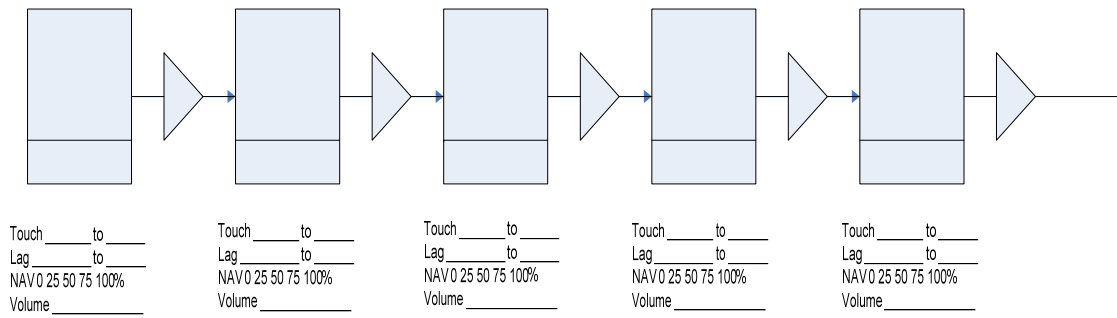
Directions for analyzing the spreadsheet:

- The chart presents a sample format for a spreadsheet analysis. For this discussion, columns are labeled A through P, and rows are labeled 1 through 161.
- The activities are listed down the left side of the page in column A, while the employee titles are listed at the head of each column B – K.
- Each employee's salary is listed under her or his title, in row 2. Salaries, in this example, are inflated by 29% to include the cost of fringe benefits at this institution.
- The responses from each employee's data-entry form are listed down his or her column. Thus, the director of business affairs spends 2 percent on purchasing, 30 percent on direct supervision, and so on...
- The formulas for columns L, M, N, O, and P are shown on the sample chart.
  - Column L represents the total number of FTE employees who spend time on the particular activity.
  - Column M represents the percentage of time spent by all employees in the college on each discrete activity.
  - Column N represents the total dollars (in staff salaries and benefits) expended on each activity
  - Column O contains the "headcount" or total number of employees who listed each discrete activity on his or her data-collection form.
  - Column P contains the "fragmentation ratio: for each discrete activity. The fragmentation ratio is the total number of employees performing an activity divided by the number of full-time-equivalent employees performing that same activity. A high fragmentation ratio implies that a large number of staff individually spend small amounts of time on the particular activity. Of course, some activities should have high ratios (such as planning, problem resolution, or program development) as they support consensus building, collaboration, and etc. However, most business-related activities do not require collaboration and should not be highly fragmented. This ratio helps the BPR team identify activities that can be consolidated to one (or just a few) employee(s) to improve processing and use of resources.
- For the major categories, total the time and costs for the activities that fall under each category. (See rows 3, 153, and 157, for example.)
  - Cell 153L contains the total number of FTE employees on all the discrete activities within the major category called "Administration."
  - Cell 153M contains the time spent by all employees on all the discrete activities within the major category called "Administration" as a percentage of total FTE employees
  - Cell 153N represents the total staffing dollars spent on all the discrete activities within the major category called "Administration."

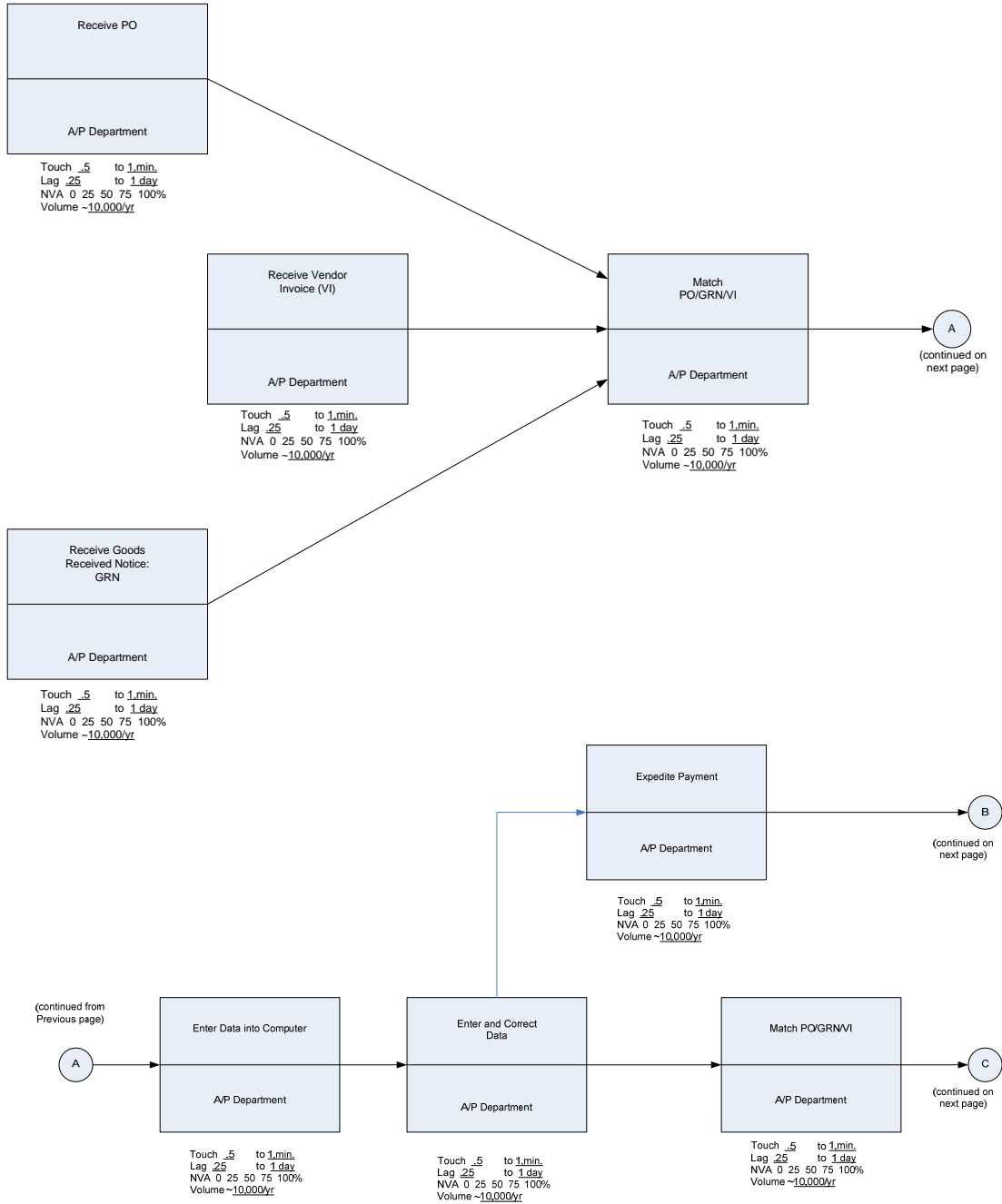
F

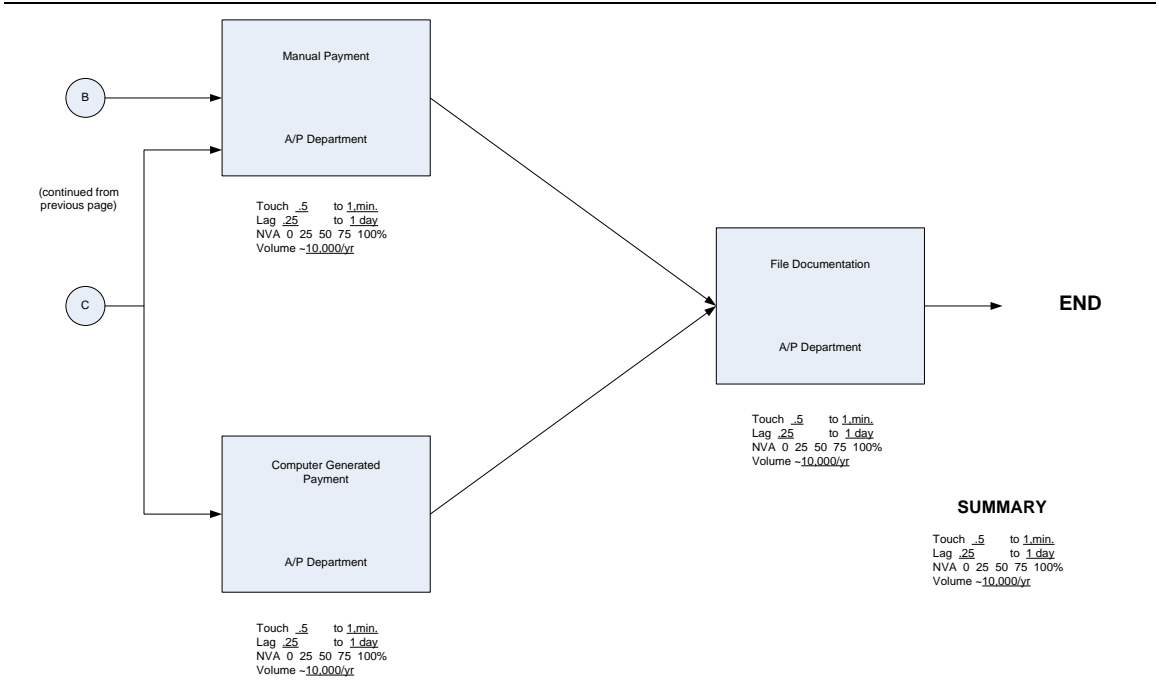
## Process Flowchart Template

Process \_\_\_\_\_

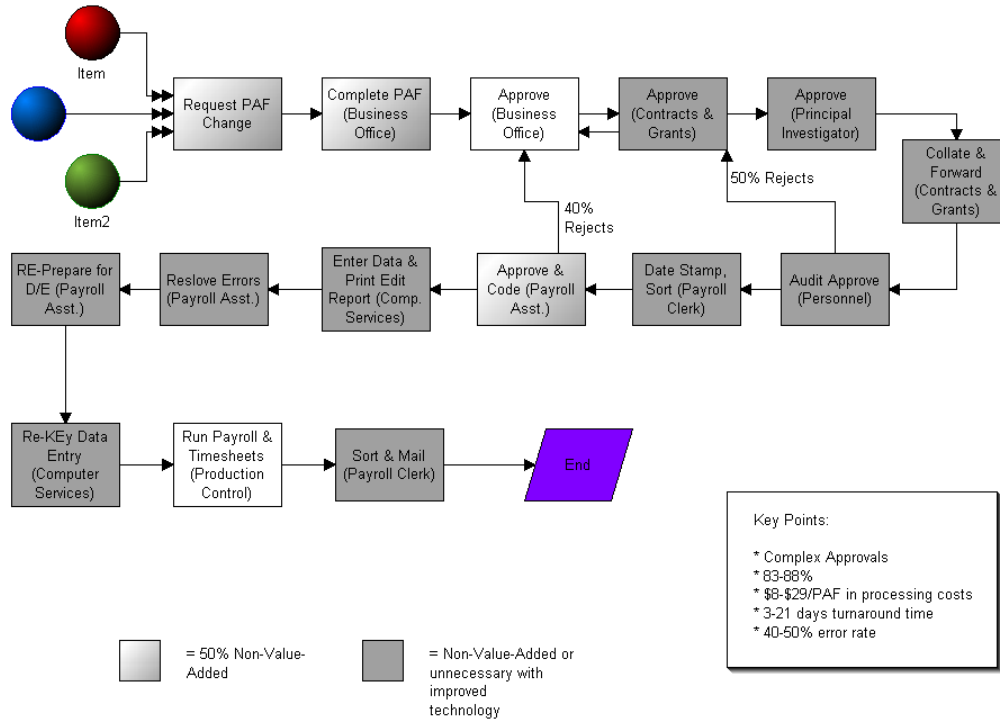


G Sample of Completed Process Flow Charting Template





H High Level Process Flowchart for Personnel Action Form (PAF) (photocopied from pg. 58)



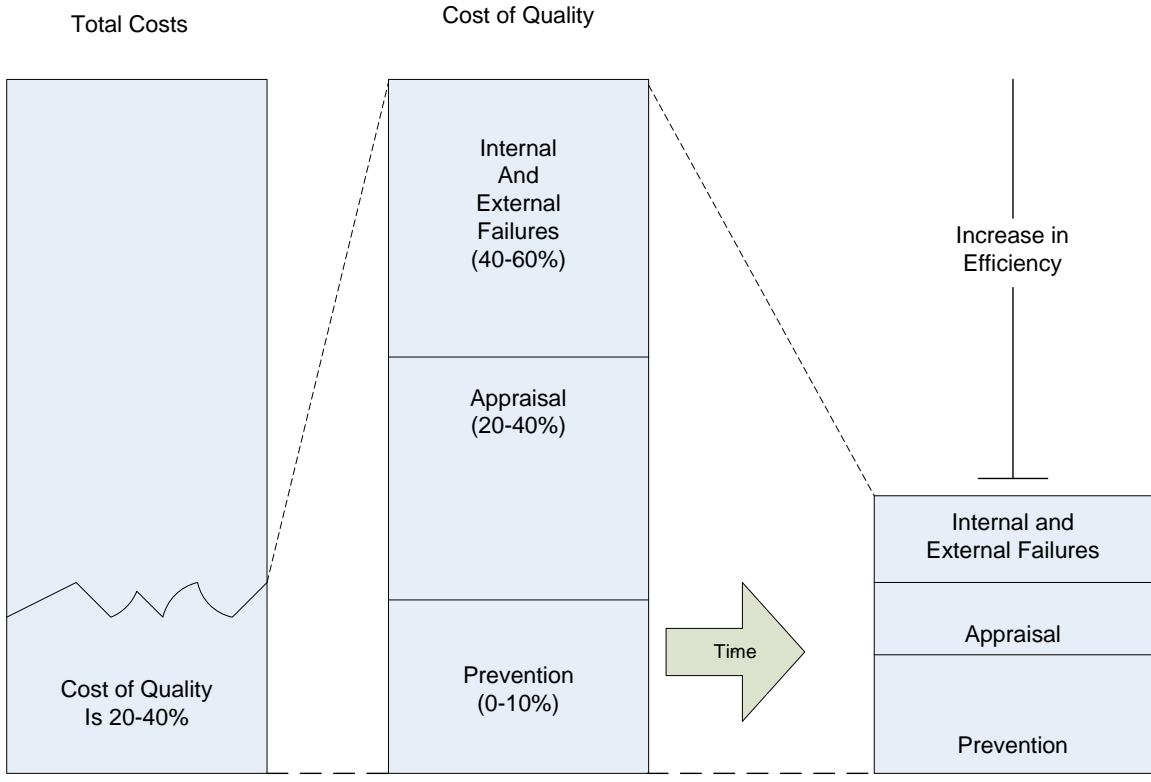
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I Sample Format for Process Flow Spreadsheet Analysis  
Detailed Data and Calculations for PAF Processing (photocopied from pg. 59)

Explanation of calculations:

- The total “minimum” NVA percentage equals the minimum number of NVA minutes divided by the minimum touch-time minutes. Interestingly, in this case, this percentage is actually greater (88 percent) than the NVA percentage (83 percent), which was calculated using the maximum NVA minutes and the maximum touch-time minutes. In many cases, as the transaction becomes more complex, proportionately more time is required in the value-adding activities, and thus the overall NVA percentage decreases.
- The average weighted salary per minute was drawn from the institution’s payroll system and includes the benefits rate of 25% at this particular university. Alternatively, the analyst can obtain the salary of each person in the process and can match the correct salary per minute to each step of the process, as appropriate.
- The formulas for cells B11, B12, and B13 are based on the “80/20 Rule.” As a rule of thumb, 80 percent of the transactions are routine, will require close to the minimum number of processing minutes, and will experience the minimum lag days. On the other hand, roughly 20% of the transactions will be more complex, requiring greater resources and experiencing greater delays. Thus, the calculation is a weighted average that accounts for this 80/20 split to estimate the overall average cost of processing one transaction.

### Desired Progression of COQ



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L Sample Format for COQ Spreadsheet Analysis

Instructions for generating Spreadsheet results:

- The COQ categories are arrayed across the top of the spreadsheet in columns AM through AP; the value-added category is column AL.
- The total staff costs for each activity (from column AK) are allocated to one of the columns AL through AP, according to the definitions presented earlier in this text.
- Row 2 of columns AL through AP contains the sums of the costs listed down each column.
- Row 3 of columns AL through AP contains the sums of the costs in each column as a percent of the total costs.

(the spreadsheet was photocopied from pg. 66)

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M Sample Graphs for Volume Analysis focusing on Transaction Types (photocopied from pg. 71)

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N Sample of Volume Analysis Focusing on Changes over Time. (photocopied from pg. 73)

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○ Illustrative Performance Measurements for Benchmarking (photocopied from pg. 78)

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P Sample Tabular Output from NACUBO Benchmarking Report (photocopied from pg. 80)

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Q Sample Scatter Diagram Relationship Between Number of Proposals Reviewed and Awarded per Sponsored Research Departmental FTE (photocopied from pg. 81)

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R Two Sample Survey's developed by BPR teams at a state university for the solicitation of high-level customer feedback. (photocopied from Appendix C at pg. 179)

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S Sample Analysis of Customer Survey Results (photocopied from pg. 87)

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T Customer Satisfaction Opportunity Map (photocopied from pg. 88)

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U Sample of a Completed Customer Satisfaction Opportunity Map (photocopied from pg. 89)