

ROADMAP TO CURRENT BENCHMARKING LITERATURE

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ABSTRACT: Benchmarking has received extensive coverage in recent publications, but the topic has often described conflicting objectives and differing recommendations for individual applications. To reduce the task of reviewing benchmarking literature for benchmarking opportunities or academic research, this article provides a summary matrix approach to current benchmarking topics. Included in this review are summaries of available textbooks, and journal and periodical articles. Benchmarking has provided the incentive for U.S. industrial organizations to look at their on-going operations with a critical eye toward continuous process improvement. However, as shown in the summary matrix, specific analytical tools to address this objective have been generally overlooked in the benchmarking literature.

INTRODUCTION TO BENCHMARKING LITERATURE

Benchmarking is a modern productivity improvement tool that has received considerable coverage in the literature following the pioneering work of Robert C. Camp and his team at Xerox in the early 1980s. This article attempts to put benchmarking literature into perspective and to provide researchers with a roadmap to materials available at the present time in this relatively new strategic arena.

The term strategic was chosen to describe the depth of commitment to continuous process improvements that must precede or parallel the benchmarking activity. Without the foundational support of a dedicated Total Quality Control (TQC) program, benchmarking is a waste of time and money. The level of performance required to compete in a world-class competitive environment is itself continuously changing as technological and operational improvements drive the benchmark ever higher and higher. The organization must therefore be willing to continue investments to support benchmarking requirements in order to be considered a world-class contender.

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It should be noted that the current benchmarking phenomenon is not a solution for all business and competitive ills. However, if the corporate structure is currently focused around the use of quality-enhancement tools and continuous process improvements, benchmarking can serve as a cornerstone for comparing one's processes with those of other organizations that are making the most effective use of resources under the constraints of existing technologies. Additionally, it is important to note that benchmarking is not for everyone. If an organization is ready to commit the resources to compete on a world-class level, they must also commit to the potential for investment in new technologies, more efficient production techniques and possibly modifications to existing relationships between management and labor, in response to increasing demands from customers and competitive leaders in a specified functional area. Additionally, appropriate cost-benefit analyses should be performed to ensure the expected benefits accruing to an organizational-process quality-improvement program (as a result of benchmarking activities) exceed the costs of acquiring benchmarking information.

For example, production at a world-class facility may be supported by just-in-time (JIT) supplies of concurrently engineered component parts to the assembly worker. A fully automated and integrated logistics supply function may be required in order to support JIT operations. For other companies to integrate this same world-class capability into their organization, the costs to purchase, design, fabricate, build, integrate, test, and operate the new system must be considered before committing to the same standard of excellence. If competitive pressures drive the decision makers to this same

level of productivity, then existing facilities may have to be scrapped or radically modified to integrate the necessary support infrastructure.

Given this caveat to the full integration of world-class standards, the reader will be provided with a state-of-the-art view of benchmarking literature by way of a summary matrix developed to support current University of Central Florida (UCF) operations analysis research activities at the National Aeronautics and Space Administration, John F. Kennedy Space Center (NASA-KSC) in Florida. This matrix is designed to provide process and quality improvement personnel with a starting point for literature reviews on benchmarking and associated topics. In the material reviewed thus far, little has been related to the analytical or procedural steps required to measure processes involved in the baseline benchmarking activity. This is a significant deficiency that must be addressed. As part of this identified discrepancy, the UCF research team is working on a structured methodology, identified as the Process Disaggregation Procedure (PDP), to identify appropriate processes across organizations for the purpose of comparative analyses.

The procedure used to develop the rating criteria for the following tables was subjectively determined by benchmarking subject matter experts (SMEs) at UCF and KSC. The values specified within the matrix were developed using a basic frequency count method under content analysis as described in the book *Educational Research* by L. R. Gay (Gay 1992). Table 1 presents a categorization of the recent texts on the subject of benchmarking. It is generally agreed that benchmarking procedures can be categorized into three basic types: internal, external, and functional (or generic). The extent to which specific topics associated with bench-

marking applications are addressed is also summarized in Table 1 (i.e. benchmarking-process definitions, TQM or quality issues, analytical tools for use in benchmarking, identification of other world-class companies, identification of consortia, and use of ethical standards in benchmarking data collection).

This ranking system was developed to indicate the level or degree of coverage in the specified publications. The value denoted by the dash was easy to assign since it indicated no coverage in the article or book at all. Brief mention of the topic under consideration rated a "minimal" value. The values "addressed" "thorough," and "extensive" were employed to indicate increasing levels of topic coverage with respect to the article length or content within the publications. A cautionary note is appropriate at this time. It is obvious that the length of the source affects the coverage ratio, therefore, the articles are treated separately from the available benchmarking books. The reader must keep this in mind as they compare level of coverage from a book to a much shorter periodical or journal article. Table 2 summarizes the information cited in current periodicals and journals relating to the same benchmarking categories as specified for the text references.

As mentioned previously, little information is available in the current benchmarking literature relating to the analytical tools needed to support benchmarking activities and the corresponding data collection and analytical requirements. This apparent deficiency is the primary motivating force behind the development of the three matrices provided in this article. The analytical tools to be considered for use in the operations analysis activity at UCF are well documented in several reference texts. Table 3 identifies a selected sample of appropriate sources that contain analytical tools to be

TABLE 1. Matrix Summary of Recent Benchmarking Books

Source (1)	Title (2)	Types of Benchmarking			Associated Issues				
		Internal (3)	External (4)	Functional (generic) (5)	Process definition (step) (6)	TQM/ quality (7)	Analytical/ tools (8)	Other world-class companies identified (9)	Consortia/ ethics (10)
American Productivity and Quality Center (<i>Benchmarking Management</i> 1993)	<i>The Benchmarking Management Guide</i>	Thorough	Thorough	Thorough	Extensive	Thorough	Addressed	Thorough	Thorough
Balm (1992)	<i>Benchmarking: A Practitioner's Guide for Becoming and Staying Best of the Best</i>	Thorough	Thorough	Thorough	Thorough	Addressed	Thorough	Thorough	Minimal
Camp (1989f)	<i>Benchmarking: The Search for Industry Best Practices That Lead to Superior Performance</i>	Thorough	Thorough	Thorough	Extensive	—	—	Thorough	—
Leibfried and McNair (1992)	<i>Benchmarking: A Tool For Continuous Improvement</i>	Extensive	Extensive	Extensive	Extensive	Thorough	Minimal	Addressed	Addressed
Miller et al. (1992)	<i>Benchmarking Global Manufacturing</i>	Thorough	Thorough	Thorough	Extensive	Thorough	Thorough	Extensive	—
Russell (1991)	<i>Quality Management Benchmark Assessment</i>	—	—	—	Addressed	Thorough	Thorough	Minimal	—
Spendolini (1992)	<i>The Benchmarking Book</i>	Thorough	Thorough	Thorough	Thorough	Minimal	Thorough	Thorough	Thorough
Watson (1992)	<i>The Benchmarking Workbook: Adapting Best Practices for Performance Improvement</i>	Addressed	Addressed	Addressed	Thorough	Thorough	Thorough	Addressed	Thorough
Watson (1993)	<i>Strategic Benchmarking: How to Rate Your Company's Performance against the World's Best</i>	Extensive	Extensive	Extensive	Addressed	Thorough	Minimal	Extensive	Thorough

TABLE 2. Matrix Summary of Recent Benchmarking Journals, Papers, and Periodicals

Source (1)	Title (2)	Types of Benchmarking			Associated Issues				
		Internal (3)	External (4)	Functional (generic) (5)	Process definition (step) (6)	TQM/ quality (7)	Analytical/ tools (8)	Other world-class companies identified (9)	Consortia/ ethics (10)
<i>American Banker</i> ("Beyond" 1993)	"Beyond Buzzwords: Creating an Action Plan"	Addressed	Addressed	Minimal	—	Minimal	—	—	—
Altany (1990)	"Copycats"	Thorough	Thorough	Thorough	Thorough	Addressed	—	Thorough	—
Altany (1991)	"Share and Share Alike"	Addressed	Thorough	Thorough	Extensive	—	Addressed	Extensive	—
Altany (1990)	"Benchmarkers Unite"	—	—	Minimal	—	Addressed	—	Minimal	Extensive
Armocost et al. (1992)	"Integrated Systems Benchmarking: New Directions and Research Opportunities for Industrialized Housing," unpublished	Addressed	Addressed	Addressed	Thorough	Thorough	Addressed	Addressed	Minimal
Atherton (1993)	"Strategy Implementation: Closing the Management Gap"	—	—	Addressed	Addressed	Minimal	—	Thorough	—
Azzolini and Shillaber (1993)	"Internal Service Quality: Winning From the Inside Out"	Thorough	Minimal	Thorough	Thorough	Thorough	Thorough	Thorough	—
Bean and Gros (1992)	"R&D Benchmarking at AT&T"	Extensive	—	Addressed	Extensive	Extensive	Thorough	Thorough	Minimal
Bemowski (1991)	"The Benchmarking Bandwagon"	Addressed	Addressed	Minimal	Extensive	Addressed	Minimal	Thorough	—
Benson (1991)	"Challenging Global Myths"	Minimal	Minimal	Minimal	Minimal	Extensive	—	Thorough	—
Biesada (1991)	"Benchmarking"	Thorough	Thorough	Thorough	Thorough	Addressed	—	Extensive	Minimal
Biesada (1992)	"Strategic Benchmarking"	Minimal	Thorough	Extensive	Thorough	Addressed	—	Extensive	Thorough
Bogan and English (1993)	"Benchmarking: A Wakeup Call for Board Members (and CEOs Too)"	Addressed	Addressed	Addressed	—	Addressed	—	Extensive	—
Bookhart (1992)	"Benchmarking Companies Focus Outward"	Minimal	Minimal	Thorough	Thorough	Thorough	—	—	—
Bracken (1992)	"Benchmarking Employee Attitudes"	Thorough	Thorough	Thorough	Thorough	Thorough	Minimal	—	Extensive
Bredin (1993)	"Benchmarking: Is It Right for Your Operation?"	Addressed	Addressed	Addressed	—	—	—	Thorough	—
Brown (1992)	"Drawing a Road Map"	Minimal	Minimal	Minimal	Minimal	Addressed	—	Thorough	—
Camp (1989a-e)	"Benchmarking: The Search for Best Practices That Lead to Superior Performance"	Thorough	Thorough	Thorough	Extensive	Thorough	Thorough	Thorough	—
Camp (1990)	"Competitive Benchmarking: Xerox's Powerful Quality Tool"	Thorough	Thorough	Thorough	Extensive	Minimal	Thorough	Thorough	—
Camp (1992)	"Learning From the Best Leads to Superior Performance"	Thorough	Thorough	Thorough	Thorough	Thorough	—	Thorough	—
Camp (1993)	"A Bible for Benchmarking, by Xerox"	Thorough	Thorough	Thorough	Thorough	Thorough	—	Extensive	Thorough
Cecil and Ferraro (1992)	"IEs Fill Facilitator Role in Benchmarking Operations to Improve Performance"	Extensive	Extensive	Extensive	Thorough	Thorough	Thorough	—	—
Chung (1993a)	"TQM: A Commitment to Corporate Excellence"	Addressed	Addressed	Addressed	Minimal	Extensive	Minimal	Minimal	Minimal
Chung (1993b)	"TQM: Internal Client Satisfaction"	Extensive	Thorough	Thorough	Addressed	Extensive	Minimal	Minimal	Minimal
Chung (1993c)	"TQM: Benchmarking Performance in the Credit Function"	Addressed	Addressed	Addressed	Thorough	Extensive	Minimal	Addressed	Thorough
Cole et al. (1993)	"Reengineering Information Systems at Cincinnati Milacron"	—	—	—	Addressed	Minimal	—	Thorough	—
Dale (1992)	"Code of Conduct' Helps to Improve Benchmarking Visits"	—	Minimal	—	—	—	—	Minimal	Extensive
Davis and Patrick (1993)	"Benchmarking at the Sun Health Alliance"	Addressed	Addressed	Addressed	—	—	—	Minimal	Minimal
Day (1992)	"Benchmarking's First Law: Know Thyself!"	Thorough	Addressed	Addressed	Addressed	Addressed	—	Extensive	Minimal
Dickey (1991)	"How Benchmarking Contributes to Total Quality Management"	Minimal	Minimal	Minimal	Addressed	Thorough	—	—	—
<i>Employee Benefit Plan Review</i> ("Benchmarking" 1993)	"Benchmarking Aids in Benefits Design"	—	Minimal	—	Thorough	—	—	Addressed	—
Enslow (1992)	"The Benchmarking Bonanza"	Thorough	Thorough	Thorough	Minimal	Thorough	Minimal	Extensive	Extensive
Ettorre (1993)	"Benchmarking: The Next Generation"	Thorough	Thorough	Addressed	—	Addressed	—	Extensive	Extensive
<i>Financial World</i> ("Best" 1991)	"Best Practice Companies"	Thorough	Thorough	Thorough	—	Minimal	—	Extensive	—
<i>Financial World</i> ("Best" 1992)	"Best Practice Companies"	Thorough	Thorough	Thorough	—	Addressed	—	Extensive	Minimal
<i>Financial World</i> ("Best" 1993)	"Best Practice Companies"	Thorough	Thorough	Thorough	—	Minimal	—	Extensive	Minimal
Fink (1993)	"Group Therapy"	Addressed	Addressed	Addressed	—	Addressed	Minimal	Extensive	—
Ford (1993)	"Benchmarking HRD"	Minimal	Minimal	Minimal	Thorough	Addressed	Addressed	Extensive	Thorough
Forger (1992)	"Where Industry Stands and Where It's Heading"	Thorough	Thorough	Thorough	—	Addressed	—	Extensive	—
Furey (1991)	"How Information Power Can Improve Service Quality"	—	Minimal	—	Thorough	Addressed	Addressed	Thorough	—
Gable et al. (1993)	"The Use of Benchmarking to Enhance Marketing Decision Making"	Minimal	Thorough	Thorough	Thorough	Minimal	Thorough	Extensive	—
Gamble (1993)	"Benchmarking Credit"	Thorough	Thorough	Thorough	—	—	Thorough	Thorough	—
Gardner (1992)	"Putting Guidelines Into Practice"	Thorough	Thorough	Extensive	—	Thorough	—	Thorough	Thorough
Hall (1993)	"Applying Benchmarking to Higher Education (Part I)"	Addressed	Minimal	Minimal	—	—	—	Thorough	Addressed

TABLE 2. (Continued)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Hall (1992)	"Fundamental Changes In Corporate Restructuring"	Thorough	Thorough	Thorough	Addressed	Thorough	—	—	Addressed
Harari (1993)	"Internal Customer, R.I.P."	Thorough	Minimal	Minimal	—	Thorough	Minimal	Thorough	—
Hequet (1993)	"The Limits of Benchmarking"	Extensive	Extensive	Thorough	Thorough	Addressed	Minimal	Thorough	Thorough
Hiebler (1993)	"A Roadmap for Success"	Addressed	Addressed	Addressed	Thorough	Thorough	Minimal	Thorough	Minimal
Hogg and Hogg (1993)	"A Quality Journey: Observations and Suggestions Regarding Continuous Process Improvement"	Addressed	Addressed	Addressed	Addressed	Extensive	Thorough	Thorough	—
Hunter and Shearman (1992)	"Benchmarking"	Thorough	Thorough	Thorough	Extensive	Addressed	Thorough	Thorough	Minimal
Jennings and Westfall (1992)	"Benchmarking for Strategic Action"	Thorough	Thorough	Thorough	Thorough	Extensive	Thorough	—	—
Julien (1993)	"The Power of Benchmarking"	Extensive	Thorough	Thorough	Thorough	—	—	—	Thorough
Kharbanda (1993)	"Benchmarking: Making it Work"	Addressed	Addressed	Addressed	Extensive	Addressed	Addressed	Extensive	Extensive
Kimmerling (1993)	"Benchmarking: Gathering Best Practices"	—	Addressed	—	Minimal	Addressed	Addressed	Extensive	Extensive
Krause and Liu (1993)	"Benchmarking R&D Productivity"	Addressed	Addressed	—	—	—	Thorough	—	—
Lenckus (1993a)	"Does Benchmarking Control Costs? Uh Huh"	Thorough	Thorough	Thorough	—	—	—	—	—
Lenckus (1993b)	"Risk Managers Warming Up to Benchmarking Projects"	Thorough	Thorough	Thorough	—	Thorough	—	Extensive	Addressed
Linsmeyer (1991)	"Fad or Fundamental?"	Thorough	Thorough	Thorough	Minimal	Thorough	Minimal	Addressed	Thorough
Main (1992)	"How to Steal the Best Ideas Around"	Minimal	Addressed	Addressed	Minimal	Thorough	Addressed	Extensive	—
Markin (1992)	"How to Implement Competitive-Cost Benchmarking"	Addressed	Addressed	Addressed	Thorough	Minimal	Thorough	—	Addressed
Martin (1991)	"Benchmarking: A Leg Up on the Learning Curve"	Addressed	Thorough	Thorough	Thorough	Thorough	Minimal	Thorough	—
McGaughey (1993)	"Customer Service: Lessons from World-Class Companies"	Thorough	Thorough	Thorough	—	—	—	—	—
McLaughlin (1993)	"Benchmarking: An Annotated Bibliography"	Thorough	Thorough	Thorough	Thorough	Minimal	Addressed	Extensive	Thorough
Meyer (1991)	"Preserving the 'WA'"	Minimal	Thorough	Thorough	—	Thorough	—	Thorough	Thorough
Micklewright (1993)	"Competitive Benchmarking: Large Gains for Small Companies"	Addressed	Addressed	Addressed	Thorough	Addressed	—	—	—
Miller (1992a)	"Benchmarking Performance"	Thorough	Thorough	Thorough	Extensive	Thorough	—	Thorough	Thorough
Miller (1992b)	"Measuring Progress through Benchmarking"	Thorough	Thorough	Thorough	—	Thorough	—	—	Thorough
Modern Materials Handling ("Four" 1990)	"Four U.S. Facilities Earn World Class Status"	—	—	—	—	Minimal	Minimal	Thorough	—
Monczka and Morgan (1993)	"Benchmarking: What You Need to Do to Make It Work"	Addressed	Addressed	Thorough	Addressed	Thorough	—	Addressed	Minimal
Mortimer (1993)	"Benchmarking in Action: Measuring Up to the Mark"	Addressed	Addressed	Minimal	Thorough	Addressed	—	Extensive	Thorough
Newman (1992)	"A True Advance or Merely a Fad?"	—	—	—	Extensive	Thorough	—	—	—
Ogilvie (1993)	"Lost in Space: Typical Benchmarking Problems"	Addressed	Addressed	Addressed	Thorough	Minimal	Thorough	—	Minimal
Owen (1992)	"Benchmarking World-Class Manufacturing"	Thorough	Thorough	Thorough	Extensive	Thorough	—	Extensive	Addressed
Port and Smith (1992)	"Beg, Borrow—and Benchmark"	Addressed	Thorough	Addressed	Addressed	Addressed	Minimal	Extensive	Thorough
Prairie (1993)	"An American Express/IBM Consortium Benchmarks Information Technology"	Thorough	Thorough	Thorough	Extensive	—	Addressed	Thorough	Addressed
Pryor and Katz (1993)	"How Benchmarking Goes Wrong (and How to Do It Right)"	Addressed	Thorough	Thorough	Thorough	Minimal	Addressed	Thorough	—
Pulat (1994)	"Benchmarking is More Than Industrial Tourism"	Addressed	Addressed	Addressed	Addressed	Minimal	Addressed	Thorough	—
Ransley (1993)	"Training Managers to Benchmark"	Minimal	Addressed	Minimal	Thorough	—	—	Extensive	Thorough
Roth (1992)	"Improving Performance with Process Analysis"	—	Addressed	Addressed	Extensive	Thorough	Addressed	Thorough	—
Ryan (1993)	"Using Peer Group Benchmarks as Analytical Tools"	—	Addressed	Addressed	Thorough	Addressed	Addressed	—	Extensive
Schmidt (1992)	"The Link Between Benchmarking and Shareholder Value"	Extensive	Thorough	Thorough	Extensive	Thorough	Extensive	Thorough	Minimal
Shafer and Coate (1992)	"Benchmarking in Higher Education"	Minimal	Thorough	Thorough	Thorough	Extensive	Addressed	Thorough	Thorough
Sharman (1992a)	"A Tool Kit for Continuous Improvement"	Extensive	Extensive	Extensive	Extensive	Thorough	Minimal	Minimal	Minimal
Sharman (1992b)	"Benchmarking: Opportunity for Accountants"	Thorough	Thorough	Thorough	Addressed	Minimal	—	—	Minimal
Sheridan (1993a)	"Lessons from the Best"	—	—	—	—	Thorough	Addressed	Extensive	—
Sheridan (1993b)	"Where Benchmarkers Go Wrong"	Addressed	Thorough	Addressed	Addressed	Thorough	Addressed	—	Thorough
Singleton-Green (1992)	"Compare and Compete"	Addressed	Addressed	Thorough	Minimal	—	—	Addressed	Thorough
Soderberg and O'Halloran (1992)	"Engineering beyond the Stars"	—	—	—	Thorough	Thorough	—	Thorough	—
Spitzer (1993a)	"TQM: The Only Source of Sustainable Competitive Advantage"	—	—	—	—	Extensive	Addressed	Extensive	—
Spitzer (1993b)	"Valuing TQM Through Rigorous Financial Analysis"	Addressed	Addressed	Addressed	Minimal	Extensive	Extensive	Thorough	—
Sprow (1993)	"Benchmarking: A Tool for Our Time?"	Thorough	Thorough	Thorough	Thorough	Minimal	Thorough	Extensive	Extensive
Stratton (1993)	"Benchmarking: Just Do It"	Minimal	Addressed	Minimal	Addressed	—	Minimal	Thorough	—
Tucker et al. (1987)	"How to Measure Yourself Against the Best"	—	Thorough	Addressed	Thorough	Minimal	—	Thorough	—

TABLE 2. (Continued)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Tuttle (1993)	"Cascading Quality through the Training Process"	Addressed	Thorough	Thorough	Addressed	Extensive	Thorough	Thorough	—
Vaziri (1992)	"Using Competitive Benchmarking to Set Goals"	Thorough	Thorough	Minimal	Extensive	Thorough	Thorough	Thorough	—
Vaziri (1993)	"Questions to Answer before Benchmarking"	Addressed	Addressed	Addressed	Thorough	Minimal	—	—	—
Verschoor (1993)	"Benchmarking the Audit Committee"	—	Addressed	Addressed	Addressed	—	—	—	—
Waasdorp (1991)	"Benchmarking for Customer Satisfaction"	Addressed	Addressed	Addressed	Minimal	—	Minimal	Addressed	—
Watson (1993)	"How Process Benchmarking Supports Corporate Strategy"	Addressed	Addressed	Thorough	Minimal	—	Thorough	Addressed	—
Weimer (1992)	"Benchmarking Maps the Route to Quality"	Addressed	Addressed	Addressed	Extensive	Thorough	Minimal	Addressed	Thorough
Wendel (1993)	"4 Sharp Tools for Learning How Your Bank Measures Up"	Thorough	Thorough	Thorough	Addressed	Addressed	Addressed	Thorough	—
Whiting (1991)	"Benchmarking: Lessons from the Best-In-Class"	Thorough	Thorough	Extensive	Thorough	Thorough	Minimal	Extensive	Thorough
Wiesendanger (1992)	"Benchmarking for Beginners"	Thorough	Thorough	Thorough	Thorough	Addressed	—	Thorough	Extensive
Working Woman ("Hot" 1992)	"Hot Topics: Benchmarking"	Minimal	Addressed	Addressed	—	Thorough	—	Thorough	—
Zairi (1992)	"The Art of Benchmarking: Using Customer Feedback to Establish a Performance Gap"	Addressed	Extensive	Addressed	Thorough	Extensive	Thorough	Addressed	Addressed

TABLE 3. Matrix Summary of Selected Analytical References

Source (1)	Title (2)	Types of Benchmarking			Associated Issues				
		Internal (3)	External (4)	Functional (generic) (5)	Process definition (step) (6)	TQM/ quality (7)	Analytical/ tools (8)	Other world-class companies identified (9)	Consortia/ ethics (10)
(a) Books									
Box et al. (1978)	<i>Statistics for Experimenters</i>	—	—	—	—	Minimal	Extensive	Minimal	Minimal
Canada and Sullivan (1989)	<i>Economic and Multiattribute Evaluation of Advanced Manufacturing Systems</i>	—	—	—	—	—	Extensive	—	—
Clemen (1991)	<i>Making Hard Decisions: An Introduction to Decision Analysis</i>	—	—	—	—	Addressed	Extensive	—	—
Gause and Weinberg (1989)	<i>Exploring Requirements: Quality before Design</i>	—	—	—	Addressed	Thorough	Extensive	—	—
Moen et al. (1991)	<i>Improving Quality through Planned Experimentation</i>	—	—	—	Thorough	Extensive	Extensive	—	—
Sink (1985)	<i>Productivity Management: Planning, Measurement and Evaluation, Control and Improvement</i>	—	—	—	—	Thorough	Thorough	—	—
(b) Journals, Papers, and Periodicals									
Brisley (1983)	"Measuring the 'Unmeasurable'"	—	—	—	Thorough	Thorough	Extensive	Thorough	—
Brisley and Fielder (1983)	"'Unmeasurable' Output of Knowledge/Office Workers Can and Must be Measured"	—	—	—	Thorough	Addressed	—	—	—
Christopher (1984)	"How to Measure and Improve Productivity in Professional, Administrative, and Service Organizations"	—	—	—	Extensive	Thorough	Extensive	—	—
Denton and Kowalski (1988)	"Measuring Nonconforming Costs Reduced Manufacturer's Cost of Quality in Product by \$200,000"	—	—	—	Minimal	Extensive	—	—	—
Dyer et al. (1992)	"Multiple Criteria Decision Making Multiattribute Utility Theory"	—	—	—	Thorough	Extensive	Thorough	—	—
Hauser and Clausing (1988)	"The House of Quality"	—	—	—	Thorough	Extensive	Extensive	—	Minimal
Hosseini and Armast (1991)	"Using the Analytic Hierarchy Process for Strategic and Policy Decisions in Engineering Management"	—	—	—	Thorough	—	Extensive	—	—
Jamali (1983)	"Putting a Productivity Improvement Program into Action: A Six Step Plan"	Addressed	Minimal	Minimal	Extensive	Extensive	Thorough	—	—
Min and Storbeck (1991)	"On the Origin and Persistence of Misconceptions in Goal Programming"	—	—	—	Extensive	—	Extensive	—	—
Snee (1993)	"Creating Robust Work Processes"	—	—	—	Thorough	Thorough	—	Thorough	—
Tuller (1988)	"Teamwork for Excellence Program Brings Out Employee Ideas and Cooperative Spirit"	Minimal	—	—	Thorough	Thorough	—	—	—

employed in support of benchmarking data analyses and continuous process improvement activities.

Tables 1–3 complement the references, which are comprised from a bibliography developed by David J. McLaughlin in September 1993. The tabular approach was used since it permits a quick overview of available benchmarking categories and the degrees of topic coverage within each source, to guide the research team directly to key reference materials without the loss of valuable time and computer search time. Use of these literature review tables should simplify the tasks associated with initial literature research activities for other operations analyst teams. Structured graphical tools such as these, provide immediate feedback to the research team and they have proven to be an invaluable asset in support of current benchmarking activities at UCF. Hopefully, the reader will find this information to be likewise useful for their applications.

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