Overview of Water Utility Benchmarking Methodologies: From Indicators to Incentives

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ABSTRACT

Benchmarking is essential for those developing and implementing water policy. The tools are important for documenting past performance, establishing baselines for gauging productivity improvements, and making comparisons across service providers. Rankings can inform policymakers, those providing investment funds (multilateral organizations and private investors), and customers regarding the cost effectiveness of different water utilities. In addition, if managers do not know how well their organization or division has performed (or is performing), they cannot set reasonable targets for future performance. Metric benchmarking quantifies the relative performance of organizations or divisions and provides managers and regulators with a foundation from which they can design policies and incentive programs to improve performance.

ROLE OF BENCHMARKING

Benchmarking provides regulators and utility managers with a way to make performance comparisons over time, across water utilities, and across countries. It can promote conflict resolution between these two groups by allowing participants to focus on performance, and can help bridge the gap between technical researchers and those practitioners currently conducting studies for government agencies and water utilities (Berg, 2007). In order to address the wide range of issues that might be encountered when evaluating water utility performance, analysts have developed five benchmarking methodologies, each of which addresses specific issues.

However, more sophisticated quantitative benchmarking tools may be necessary (but not sufficient) for promoting policies that can improve company (and sector) performance. The introduction of greater rigor allows stakeholders to quantify utility progress towards meeting policy objectives, helps specialists identify high performing utilities (whose processes might be adopted by others), and enables regulators to develop targets and incentives for utilities (Mugisha et al., 2007).

Although there are several methodologies available for benchmarking, it is important to keep in mind that a single index of utility performance has the same problems of any indicator: it will be neither comprehensive nor fully diagnostic. This problem can be liked to the information a physician can collect from a patient. Knowing a patient's temperature, pulse, height and weight help the physician determine whether the person has a dangerous fever and/or is overweight. The indicators point to potential or existing health problems. However, a set of blood tests will provide more detailed information that can aid in diagnosing the physical problems that are only partly reflected in the two health indicators. Therefore, when conducting benchmarking analyses, water professionals must understand the strengths and limitations of different metric methodologies.

BENCHMARKING METHODOLOGIES

Core Overall Performance Indicators include a number of *Specific Core Indices*, such as volume billed per worker, quality of service (continuity, water quality, complaints), unaccounted for water, coverage, and financial data. These partial measures are generally available, and provide the simplest way to perform comparisons, as well as a summary index that can be used to communicate relative performance to a wide audience. However, an OPI may fail to account for the relationships among the different factors.

Performance Scores based on Production or Cost Estimates are used to identify the best performers and the weakest performers in a group of utilities. The metric approach allows quantitative measurement of relative performance (cost efficiency, technical/engineering

efficiency, scale efficiency, allocative efficiency, and efficiency change). Performance can be compared with other utilities and rankings can be based on the analysis of production patterns and/or cost structures. Estimated parameters can give an indication of economies of scale and/or economies derived from the joint supply of water and wastewater services.

Engineering/Model Company approach has been used to establish baseline performance. This methodology requires the development of an optimized economic and engineering model based on creating an idealized benchmark specific to each utility—incorporating the topology, demand patterns, and population density of the service territory. As with any methodology, this approach also has its limitations. The engineering models that support it can be very complicated, and the structure of the underlying production relationships can be obscured through a set of assumed coefficients used in the optimization process.

Process Benchmarking focuses on individual production processes in the vertical production chain. This approach allows one to identify specific stages of the production process that warrant attention. Many water associations focus on process benchmarking as a mechanism for identifying potential benchmarking partners, preparing for and undertaking benchmarking visits, and implementing best practices. Thus, water utility managers recognize that information sharing and coordination is a significant performance driver across companies. One drawback to this particular method of benchmarking is that the big picture gets lost: engineers focus on the trees and miss out on the forest.

Customer Survey Benchmarking focuses on the perceptions of customers as a key element for performance evaluation. Customer perceptions regarding service quality are central to evaluating water utility performance and surveys can reveal performance gaps and identify areas of concern. In addition, trends over time can be used by regulators and policy-makers to evaluate utility performance. Nevertheless, many other factors are relevant for evaluating the efficient provision of water services.

BENCHMARKING: BEYOND PRODUCTION PROCESSES

The Chart on the next page is an example model of the benchmarking process. It shows how input prices, input levels, and external circumstances enter into the production process. Some variables are under current management's control (like variable inputs), while others are the result of past managerial decisions. The cost of capital and the prices of variable inputs determine total economics costs, which analysts sometimes only can identify the determinants of Operating Expenses. Some factors affecting the production process and associated costs are determined external to the utility (population density, topology of the service territory, customer ability to pay, etc). Performance scores based on production or cost models need to take such factors into account, so that analysts are comparing apples to apples.

The focus here is on performance scores based on comprehensive production and cost studies. The Chart categorizes this type of analysis emphasizes efficiency and productivity. The performance scores discussed here are based on statistical studies and Data Envelopment Analysis (DEA). In addition, the bottom of the Chart contains boxes reflecting three other aspects of water sector performance that do not receive enough attention: financial sustainability, customer satisfaction, and water resource sustainability.

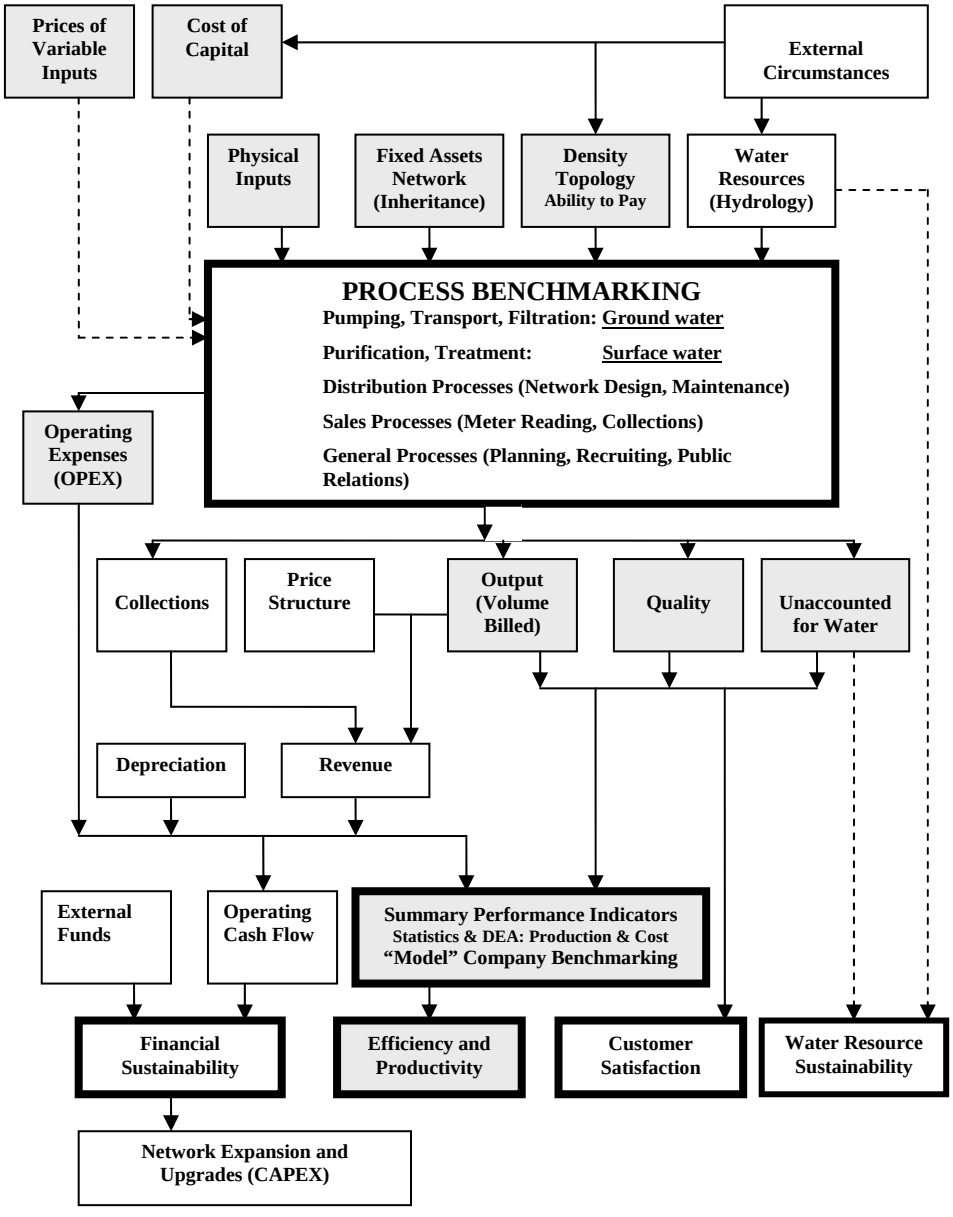
Consideration of financial sustainability includes examining how the role of collections, revenues, and operating expenses affect overall performance. Key financial ratios should serve as indicators of long term performance as revenues can be used to facilitate future capacity investments for both network expansion and external funding can be contingent on current cash flows more than covering operating expenses.

Customer Satisfaction Benchmarking has already been identified as one of the five most-used methodologies; nevertheless, survey benchmarking only gives a "rough" picture of how customers perceive utility service offerings. Utility rankings based on survey scores might simply be reflect customer sentiments rather than technical features of service quality. More

attention might be given to identifying cost-effective methods of capturing customer sentiments and designing programs that address (subjective) consumer perceptions.

Water Resource Sustainability is another issue that is not given adequate attention in the analysis of utility performance. There are limitations on how far natural resources can be developed and current performance scores do not rank utilities on whether their withdrawal and disposal methods are sustainable, both in terms of water quantity and quality. Incorporating this indicator into current benchmarking practices would give more weight to long-term performance and sustainability, which is crucial if utilities are to operate efficiently in the future.

Chart: Inputs, Processes, Outcomes, and Performance Benchmarking



FIVE STEPS FOR A BENCHMARKING STUDY

The benchmarking process can be divided into five steps: identify objectives, select methodology and gather data; screen and analyze data; utilize specific analytic techniques; conduct consistency/sensitivity tests; and develop policy implications. To successfully perform each of these steps, experts with financial, statistical and regulatory backgrounds are needed to help define the issues to be addressed and select the proper model and analytic techniques for quantifying performance. There must also be sufficient data, both in terms of quality and quantity. Because benchmark analyses are used to make performance comparisons, it is also important to determine the accuracy and robustness of the performance scores as they may have significant financial or social impacts. If efficiency scores are to have any use for managerial incentive or as elements in regulatory mechanisms, stakeholders need to be confident that the scores reflect reality, and are not just artifacts of model specification, sample selection, treatment of outliers, or other steps in the analytic process. Those studies that do pass these sensitivity tests can then be used to explore in greater detail the potential determinants of inefficiencies across firms and over time. Differences in population density, topology, distance from raw water sources, and political constraints on prices (affecting the financial sustainability of operations) may affect relative performance, therefore it is useful to seek public comments that might augment the benchmarking analysis effort. There are at least six audiences for yardstick comparisons.

AUDIENCES FOR BENCHMARKING STUDIES

Benchmarking is both a science and an art. Even the best statistical analysis will be ignored if it is not carefully presented. The elements that are to be emphasized will depend on the audience of the particular study. The reports must communicate the implications of the study—emphasizing components that are especially important for different audiences.

Benchmarking specialists produce and critique studies that utilize various methodologies. Rankings can be manipulated by choice of variables, model specification,

sample size, time frame, and treatment of outliers. Because the stakes are high, affected parties have an interest in the relative and absolute performance evaluations prepared by analysts, and studies can be controversial.

The *press* filters and highlights reports, using executive summaries and interviews. Although technical reports are not amenable to sound bites, most newspaper and television journalists seek the clear message that emerges from a benchmarking study. However, some seek sensational factoids that support their own ideological predilections and some lack the expertise to interpret technical studies.

The *general public* is not well-positioned to evaluate conflicting claims. Long before a benchmark comparison is released, the responsible agency should be engaging in an information-dissemination campaign, informing political leaders and the press about the purpose of the forthcoming report. NGOs and formal citizen advisory committees that can be established by regulatory commissions provide opportunities for input and feedback for citizens.

The *regulator* reviews studies and creates performance incentives to achieve policy objectives. Productivity measures and other measures of technical efficiency provide valuable information for regulators. However, excessive simplicity can result in a distorted analysis. Sector performance also depends on efficient price signals, benefits from quality improvements, incorporation of environmental impacts into decisions, recognition of transition costs, and ability to meet agreed-upon social obligations.

National policymakers (elected representatives and appointed officials) react to and utilize technical studies in setting priorities and interacting with international organizations. Solid data regarding the actual performance of public and privately owned utilities can be used to counter the politicization of infrastructure pricing.

Water utility managers are sensitive to comparisons as they have much to lose (and something to gain) when information is made public. It is extremely difficult for outsiders to evaluate managerial performance. Inadequate reports and the selective presentation of

information mean that only insiders know whether the organization is managed well or poorly. Benchmarking reduces the extent of this information asymmetry. For this reason, utility managers might delay or block serious benchmarking initiatives.

CONCLUSIONS

Benchmarking is a fundamental requirement of good management and can help managers and regulators identify historical trends, determine today's baseline performance, and quantify relative performance across utilities. The application of the methodologies summarized here can be used to improve service quality, expand networks, and optimize utility operations. Any benchmarking study will have limitations, but sound studies can be used to place the burden of proof on other parties who might argue that the analysis is incomplete or incorrect. Over time, data availability will improve and studies will be strengthened as professionals gain experience with these quantitative techniques. In the process, governance procedures within companies can incorporate this information into managerial incentive packages (Mugisha et al., 2007). Thus, rankings can serve as catalysts for better stewardship of water and other resources. Still, care must be taken to use comprehensive indicators, lest those being evaluated "game" the system. If only a subset is used, performance may improve for some dimensions of a firm's operations but may diminish for others.

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