



# Benchmarking local public libraries using non-parametric frontier methods: A case study of Flanders



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## ABSTRACT

Being faced with significant budget cuts and continual pressure to do more with less, issues of efficiency and effectiveness became a priority for local governments in most countries. In this context, benchmarking is widely acknowledged as a powerful tool for local performance management and for improving the efficiency and effectiveness of local service delivery. Performance benchmarking exercises are regularly carried out using ratio analysis, by comparing single indicators. Since this approach offers only limited assessments in absolute terms, it is difficult for decision-makers to track and improve overall performance. Therefore, the use of non-parametric frontier methods, namely free disposal hull (FDH) and data envelopment analysis (DEA) is presented as an alternative technique for benchmarking the performance of organizations in relative terms. The potential applications and strengths of these non-parametric frontier methods for benchmarking the efficiency of local public services are highlighted by applying FDH and DEA techniques to the local public libraries in Flanders. Incorporating all possible paths of expansion – both in space and in time – enables a focus on sustainability within efficiency benchmarking.

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## 1. Introduction

The current economic and financial situation puts public sector performance under pressure, both in Flanders and abroad. In fact, the budgetary space for the different Belgian governments is shrinking, while the demand for qualitative public services keeps rising (Troupin, Stroobants, & Steen, forthcoming). Also local governments in Flanders cannot avoid the consequences of the economic crisis and decreasing revenues (Belfius, 2013). In its policy statement on Internal Administration 2009–2014, the Flemish Government indicated that over the coming years there is no policy space for creating important financial incentives, meaning that local governments themselves have to take responsibility for improving their efficiency and effectiveness in order to perform better, and to provide more and better services, with less means (Bourgeois, 2009).

One of today's main instruments for measuring and evaluating performance, as a tool for identifying and adopting more efficient and effective practices, is *benchmarking* (Fenna, 2012). Benchmarking involves placing an entity's performance in context by comparing performance with standards, with figures for the same measures in previous reporting periods, or with performance results achieved by others (Ammons, 2012). Applied in the public sector, benchmarking is defined as contextualising the current performance of a public

sector organization by comparing it with other (similar) organizations or its own past, with an intent to improve (Askim, Johnsen, & Christophersen, 2008; Berg, 2010).

Benchmarking methods for performance comparisons are mostly developed and introduced by practitioners. Many practitioners use simple techniques rather than analytical methods (Talluri, 2000). Besides these more simple benchmarking approaches, non-parametric frontier techniques can be effective and alternative methods for performance analysis and benchmarking when the measurement issue is considered in terms of (technical) efficiency.<sup>1</sup> For benchmarking local government performance, however, there is still a need to demonstrate the application and value of these non-parametric frontier methods: free disposal hull (FDH) and data envelopment analysis (DEA).

## 2. Problem statement

Benchmarking and performance comparisons of public sector organizations are usually conducted by using (a set of) indicators or performance measures, especially when carried out by practitioners and decision-makers in the policy arena (van Helden & Reichard, 2013).

<sup>1</sup> Technical efficiency is the ability to convert a certain bundle of inputs to the maximum possible amount of output (with current technology, as evidenced by the best performance observed) – or, alternatively, the situation in which as little input as possible is used in producing a certain amount of output (Agasisti & Johnes, 2009).

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**Table 1**  
Efficiency analyses of libraries<sup>a</sup>, specification of inputs and outputs.

Reference	Sample/technique	Inputs	Outputs
Kwack (1993)	20 university libraries/DEA	Library staff Area of library space Number of library books	Reader visits Book circulation
Chen (1997)	23 university and college libraries/DEA	Library staff Book acquisition expenditure Book collection Area of library space Seating Capacity	Reader visits Book circulation Reference and on-line research Annual service hours Reader satisfaction Interlending service
Mann (1997)	108 university libraries/DEA	Staff Total expenditures	Total volumes Total volumes added Current serials <sup>b</sup>
Vitaliano (1998)	184 public libraries/DEA	Total holdings of all items (books, audiovisual, maps, etc.) Total hours of operation per week New books purchased Total serial subscriptions currently active <sup>b</sup>	Annual total circulation of all library materials Number of reference questions answered
Sharma, Leung, and Zane (1999)	47 public libraries/DEA	Book collection Library staff Days open (in 8-hour days) Operating expenses	Book circulation Reader visits Reference transaction
Worthington (1999) Shim (2000)	168 local public libraries/DEA 95 academic libraries/DEA	Gross library expenditure Professional staff Support staff Student staff Volumes held Net volumes added Monographs purchased Total serials <sup>b</sup>	Number of library issues Total circulation Reference transactions Interlibrary lending Interlibrary borrowing Library instruction
Hammond (2002)	99 public library systems/DEA	Total opening hours per week Number of books and audio-visual material Acquisitions of new material Number of serial subscriptions <sup>b</sup>	Total number of items issued to borrowers over the year Number of enquiries processed Number of requests processed Number of book materials added Weekly opening hours Circulation
Reichmann (2004)	118 university libraries/DEA	Staff (number of FTEs) Book materials held	Serial subscription <sup>b</sup> Number of visitors Number of loan books Number of books for lending and borrowing
Jo, Park, Lee, and Yoon (2009)	26 university libraries/DEA	Number of employees Size of library Budget Number of books Yearly acquisition expenditures Yearly salary expenditures Collection size Floor area	Number of readers Number of loans
Miidla and Kikas (2009)	20 central public libraries/DEA	Number of employees (FTEs) Total number of book materials	Number of book materials added Total Circulation Number of serial subscriptions <sup>b</sup>
Reichmann and Sommersguter-Reichmann (2010)	68 university libraries/DEA	Budget Number of librarians Number of books Number of serials Number of e-journals Web databases Number of e-books Number of computers Internally developed database units	Number of circulation books Number of users Number of website visits Number of database users
Noh (2011)	89 university libraries/DEA	Personnel expenditures Operating expenditures Infrastructure	Opening hours per week Youth books Fiction and non-fiction books Media (CD, DVD, VHS, CD-ROM)
De Witte and Geys (2011)	290 local public libraries/FDH & DEA	Personnel expenditures Operating expenditures Infrastructure	Youth books Fiction and non-fiction books Media (CD, DVD, VHS, CD-ROM) Young borrowers (<16 years) Total book circulation Media circulation Total circulation Inter-library loans
De Witte and Geys (2012)	291 local public libraries/FDH	Personnel expenditures Operating expenditures Infrastructure	Number of documents downloaded Number of monographs Number of serial subscriptions Number of seats Service hours
Simon, Simon, and Arias (2011)	34 university libraries/DEA	Personnel Total surface area Total expenditures on bibliographic-related materials (monographs, serial subscriptions, access to electronic resources, etc.)	

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