Strategic Performance Management of Urban Sustainability

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Abstract

This research provides a comprehensive framework for simultaneously evaluating urban sustainability from three perspectives—economic, environmental and social. We assess the urban sustainability of 32 boroughs in London from 2012 to 2015 with the aim of identifying the best practices of and the lessons learned by the borough councils. Given the performance measures constituting both desirable and undesirable outputs and dynamic changes, the Malmquist–Luenberger Index (MLI) approach is applied. The results indicate that: (1) Twenty-five percent of the boroughs showed productivity growth over the three-year period. (2) Reducing energy consumption has a significant, positive effect on sustainability, while density, industrialisation and deprivation have a negative effect. The geographic spread of boroughs also affects performance. (3) The power of politics and finance play a critical role in overall performance. This research takes a novel approach in studying urban sustainability at the borough level to determine how local authorities contribute to overall urban sustainability.

Research Gap

Research Gap 1: There is a noticeable imbalance in assessing urban sustainability. Thus, there is a lack of comprehensive urban sustainability framework which can simultaneously assess *three aspects: environmental, economic and social*.

Research Gap 2: The key *local sustainability factors* can contribute to assess urban sustainability at the local level based on to their priorities. This will provide a positive impact on policymakers to include requirements of local sustainability factors to achieve efficient urban sustainability. Therefore, the existing literature review suggests the need of considering local sustainability factors and developing a suitable performance evaluation framework to provide comprehensive sustainability assessment.

Research Gap 3: The existing studies used the traditional DEA methods which cannot handle *undesirable outputs* and *dynamic changes* over time. Moreover, the importance of considering undesirable variables such as CO_2 emissions and observing the *dynamic changes* over time neglected.

Research Gap 4: The majority of the existing urban sustainability efficiency studies are undertaken at the city and country level. The urban sustainability assessment at the **borough level** has been rarely touched which limits the understanding of city inter mechanism and its impacts on urban sustainability.

Methodology

Data Envelopment Analysis (DEA) is a mathematical programming method that evaluates the relative efficiencies of multiple DMUs based on multiple inputs and outputs(Banker et al., 1984; Charnes et al., 1985, 1979; Thanassoulis, 2003). A classical DEA model which transforms inputs into outputs. This is also known as a Black Box Approach and ignores internal processes, productivity growth, dynamic changes and undesirable outputs. **A Malmquist Luenberger Index** model used which considers productivity growth, dynamic changes and undesirable outputs.

BOFPAR FRAMEWORK FOR LONDON BOROUGHS

1)Boroughs' characteristics   B

2)Objectives   O

3)Factors and Challenges   F

4)Performance Assessment Framework   P

5)Application of Performance assessment model   A

6)Results and Action Plans   R

Framework to Assess Performance of London Boroughs

London Boroughs (DMUs)

Input Variables
- Electricity Consumption
- Gas Consumption
- Coal Consumption
- Consumption of Other Energy Sources i.e. Petroleum
- Labour
- Capital

Three Pillars- Key Factors

Environmetal — Economical — Social

Undesirable Output Variables
- CO_2 Emissions

Desirable Output Variables
- GDHI
- Life Satisfaction Rate
- Social Benefits Paid

Main Findings

The MLI results show that only 25% of the boroughs improved their productivity from 2012 to 2015. The rest of the results for the boroughs are less than 1, which indicates a decline in their performance from 2012 to 2015. The boroughs of Tower Hamlets, Westminster and Camden achieved the highest improvement compared to the other boroughs at 114%, 113% and 107%, respectively. The lowest MLI results were obtained in the boroughs of Haringey, Greenwich and Havering at 71%, 73% and 73%, respectively, from 2013 to 2014

Managerial Insight

The industrial sector triggers heavy usage of energy and generates a high level of CO2 emissions, the outer boroughs have achieved high efficiency scores by focusing more on technical development, improving industrial areas and building strong sustainability strategies. The key issues we detected for underperforming boroughs were high energy consumption, greenhouse gas emissions, lack of affordable houses and lower income. Therefore, underperforming boroughs need detailed measures and policy guides to increase sustainability. We identified density, industry and borough structures and deprivation as factors that are impacting urban sustainability.