Measuring sustainable transport performance through an integrated DEA-based capacity utilization measure: An application to the Indian public bus transport sector

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Abstract. Public transport entities were traditionally expected to provide access and mobility. However, with the ever-increasing carbon footprints resulting from increasing private vehicle ownership, they are also expected to provide environmentally sustainable, safe, and reliable services. Hence given these additional societal and environmental commitments apart from their traditional economic objectives, conventional frameworks to study the performance of public transport undertakings need to be seriously relooked. Capacity Utilization(CU) is a yardstick to measure potential service levels of bus companies. The current study examines the CU of the Indian public bus companies considering all three aspects of sustainability: economic, societal, and environmental. We consider four significant criteria representing sustainable goals for performance evaluation: production of revenue-earning output, safety and reliability aspects, and carbon emissions. To do so, we develop a CU indicator based on the data envelopment analysis (DEA) technique to explore the sustainable service potential of the bus companies that can be achieved with the set of available resources at their disposal. The dataset of 34 firms was adopted for the study from 2015 to 2017. The key findings indicate that there is an adequate amount of excess capacity lying with the sector. Nearly 70% of the firms emerged as capacity-inefficient.

Keywords: capacity utilization; service-quality; carbon-emissions; sustainable transport; public bus transportation; DEA

References

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