

**EVALUATION AND MODIFICATION OF SERVICE LEVEL
BENCHMARKS FOR SUSTAINABLE URBAN TRANSPORT
IN INDIA**

SANJEEV KUMAR LOHIA



**TRANSPORTATION RESEARCH AND INJURY PREVENTION
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**EVALUATION AND MODIFICATION OF SERVICE LEVEL
BENCHMARKS FOR SUSTAINABLE URBAN TRANSPORT
IN INDIA**

by

SANJEEV KUMAR LOHIA

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(TRIPP)**

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in fulfilment of the requirements of the degree of

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Dedicated to my family

CERTIFICATE

This is to certify that the thesis entitled “**Evaluation and Modification of service level benchmarks for sustainable urban transport in India**” submitted by **Sanjeev Kumar Lohia** to the Indian Institute of Technology Delhi, for the award of the degree of **Doctor of Philosophy**, is a record of the original bonafide research work carried out by him under our supervision and guidance.

The thesis work, in our opinion, has reached the requisite standard fulfilling the requirements for the degree of Doctor of Philosophy. The results contained in this thesis have not been submitted in part or in full, to any other university or institute for the award of any degree or diploma.



Dr. Geetam Tiwari

Professor

Department of Civil Engineering
Indian Institute of Technology Delhi



Dr. Vrajindra Upadhyay

Professor

Department of Humanities and Social Sciences
Indian Institute of Technology Delhi

Date: 15th October 2021

New Delhi

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ABSTRACT

This thesis has explored development of comprehensive service level benchmarks for urban transport through evaluation and modification of service level benchmarks adopted by erstwhile Ministry of Urban Development (MoUD) (Now renamed as Ministry of Housing and Urban Affairs), Government of India, in 2009 (MoUD SLBs, 2009) as well as development of a composite Sustainable Urban Transport Index (SUTI) for cities to rate their performance against fulfilment of the goals of the National Urban Transport Policy (NUTP, 2006).

The MoUD SLBs, 2009 were taken as the base for detailed evaluation to list various shortcomings in becoming an effective tool for performance measurement of cities towards fulfilment of the goals of NUTP, 2006. They were then modified using Delphi technique for survey of experts and stakeholders in two stages, first for modification of SLBs and their indicators; and thereafter for assigning weights to different indicators and benchmarks using the modified SLBs. The results were then used for impact analysis using the secondary data for 13 cities, which had been benchmarked by Urban Mass Transit Corporation & Institute of urban transport (UMTC & IUT, 2013) and Centre for Engineering Planning and Technology (CEPT, 2013) as per studies commissioned by MoUD.

The major finding of the study is that for achieving the goals of sustainable urban transport more comprehensively, the MoUD SLBs, 2009 require substantial modifications like addition of one benchmark (renamed as Performance area) of Intermediate Para transit; addition of some indicators in the benchmarks (performance areas) of public transport facilities, pedestrian infrastructure facilities and road safety; shifting of some indicators in performance areas; change in the level of service (LOS) evaluation method for indicators of cycling facilities and pedestrian facilities; defining differential standards for some indicators like population density and extent of supply of public transport depending upon the size of the city thus making

SLBs equally relevant to the small and medium cities as well. Furthermore different indicators and performance areas have been assigned different weights as derived from survey of the stakeholders and statistical analysis.

The study has also helped in developing a comprehensive Sustainable Urban Transport Index (SUTI) framework for a city combining lot of disaggregated information into a single composite index. SUTI can be a very effective tool for the policymakers as well as people at large, who have neither the expertise nor the inclination and time to go into intricate details of various urban transport parameters, to not only compare different cities of similar class but also monitor the impact of various investments and action plans. The study can be used effectively for social audit of various policies, plans and projects of the public agencies.

This study was limited in a way because of absence of time series data to study the impact of the performance areas as well as indicators over a long period of time to co-relate them to the outputs and outcomes of NUTP, 2006. The co-relation to the achievement of the goals of NUTP, 2006 is, therefore, based only on the opinion of various stakeholders.

सार / निष्कर्ष

यह थीसिस 2009 (MoUD SLBs, 2009) में तत्कालीन शहरी विकास मंत्रालय अब) (एमओयूडी)आवास और शहरी मामलों के मंत्रालय(, भारत सरकार द्वारा अपनाए गए शहरी परिवहन के सेवा स्तर के बेंचमार्क के मूल्यांकन और संशोधन के माध्यम से शहरी परिवहन के लिए व्यापक सेवा स्तर के बेंचमार्क का विकास करना और साथ ही राष्ट्रीय शहरी परिवहन नीति)NUTP, 2006) के लक्ष्यों की पूर्ति के लिए शहरों के प्रदर्शन का मूल्यांकन करने के लिए एक समग्र सतत शहरी परिवहन सूचकांक)SUTI) का विकास का प्रयास है ।

एमओयूडी एसएलबी, 2009 को एनयूटीपी, 2006 के लक्ष्यों की पूर्ति के लिए शहरों के प्रदर्शन मापन के लिए एक प्रभावी टूल बनने में विभिन्न कमियों को सूचीबद्ध करने के लिए विस्तृत मूल्यांकन के आधार के रूप में लिया गया। फिर उन्हें विशेषज्ञों और हितधारकों के सर्वेक्षण के लिए डेल्फी तकनीक का उपयोग करके दो चरणों में संशोधित किया गया। पहला एसएलबी और उनके संकेतकों के संशोधन के लिए; और उसके बाद संशोधित एसएलबी का उपयोग करते हुए विभिन्न संकेतकों और बेंचमार्क को महत्व देने के लिए। इस परिणाम को 13 शहरों के लिए द्वितीयक डेटा का उपयोग करके प्रभाव विश्लेषण के लिए उपयोग किया गया , जिन्हें शहरी जन परिवहन निगम और शहरी परिवहन संस्थान यूएमटीसी और आईयूटी), 2013) और सेंटर फॉर इंजीनियरिंग प्लानिंग एंड टेक्नोलॉजी सीईपीटी), 2013) एमओयूडी द्वारा कमीशन किए गए अध्ययन के अनुसार, बेंचमार्क किया गया ।

अध्ययन का प्रमुख निष्कर्ष यह है कि स्थायी शहरी परिवहन के लक्ष्यों को और अधिक व्यापक रूप से प्राप्त करने के लिए, शहरी विकास मंत्रालय के एसएलबी, 2009 में पर्याप्त संशोधनों की आवश्यकता है जैसे मध्यवर्ती पैरा ट्रांजिट के एक बेंचमार्क प्रदर्शन क्षेत्र) को जोड़ना (के रूप में नामित; सार्वजनिक परिवहन सुविधाओं, पैदल यात्री बुनियादी सुविधाओं और सड़क सुरक्षा के बेंचमार्क में कुछ संकेतकों को जोड़ना (प्रदर्शन क्षेत्रों); प्रदर्शन क्षेत्रों में कुछ संकेतकों का स्थानांतरण; साइकिलिंग सुविधाओं और पैदल यात्री

सुविधाओं के संकेतकों के लिए सेवा के स्तर मूल्यांकन पद्धति में परिवर्तन (एलओएस); जनसंख्या घनत्व और शहर के आकार के आधार पर सार्वजनिक परिवहन की आपूर्ति की सीमा जैसे कुछ संकेतकों के लिए अंतर मानकों को परिभाषित करना इस प्रकार एसएलबी को छोटे और मध्यम शहरों के लिए भी समान रूप से प्रासंगिक बनाता है। इसके अलावा विभिन्न संकेतकों और प्रदर्शन क्षेत्रों को हितधारकों के सर्वेक्षण और सांख्यिकीय विश्लेषण से प्राप्त अलगअलग भार सौंपा गया है।-

अध्ययन ने एक शहर के लिए एक व्यापक सतत शहरी परिवहन सूचकांक (एसयूटीआई) ढांचे को विकसित करने में भी मदद की है, जिसमें एक ही समग्र सूचकांक में बहुत सारी अलगसाथ बड़े-अलग जानकारी शामिल है। एसयूटीआई नीति निर्माताओं के साथ-पैमाने पर लोगों के लिए समानवर्ग के विभिन्न शहरों की तुलना करने व विभिन्न निवेशों और कार्य योजनाओं के प्रभाव आंकलन के लिए एक बहुत प्रभावी मापदंड हो सकता है, जिनके पास न तो विशेषज्ञता है, ना ही विभिन्न शहरी परिवहन मानकों के जटिल विवरण में जाने का झुकाव और समय है। सार्वजनिक एजेंसियों की विभिन्न नीतियों, योजनाओं और परियोजनाओं के सामाजिक अंकेक्षण के लिए अध्ययन का प्रभावी ढंग से उपयोग किया जा सकता है।

यह अध्ययन एक तरह से सीमित था क्योंकि एनयूटीपी, के आउटपुट और 2006 साथ संकेतकों-लिए प्रदर्शन क्षेत्रों के साथ संबंधित करने के-परिणामों के साथ उन्हें सह के प्रभाव का अध्ययन करने के लिए समय श्रृंखला डेटा की अनुपस्थिति थी। इसलिए, एनयूटीपी, के लक्ष्यों की उपलब्धि का संबंध केवल विभिन्न 2006 हितधारकों की राय पर आधारित है।

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