Development of Freight Generation Model in Urban Areas

Prasanta K. Sahu, PhD

Department of Civil Engineering, Birla Institute of Technology and Science Pilani

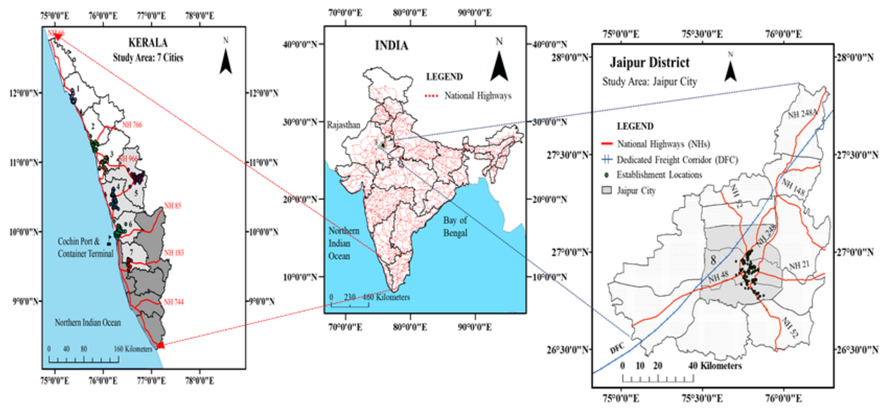
Email: prasanta.sahu@hyderabad.bits-pilani.ac.in
Website: https://www.bits-pilani.ac.in/hyderabad/prasantasahu/profile

PROJECT OVERVIEW

Title: Development of Freight Generation Model in Urban Areas
Grant: Research Initiation Grant (2015-2017); **Organisation:** BITS Pilani

- Grant No.: RIG Head 06/03/302
- Sanctioned Amount: ₹200000 ($ 3000) (2016 rate: 1 $ = ₹68)
- Utilized Amount:₹142336 ($ 2000)
- Project Team: Prasanta Sahu, Agnivesh Pani, Aitichya Chandra, Furqan A. Bhat
- Study States: Kerala and Rajasthan
- Sample Size: 432 and 176

STUDY REGIONS AND SURVEY



Kerala (7 Cities)

Sample Description

- Sample Frame = 54170
- Gross Sample Drawn = 1425; SRS
- Sample Loss = 13.7 % ; Average Response Rate = 30.3 %
- Final Sample – 432 Establishments and 1631 Records

Survey Cities (Year of Survey)

- Cochin (2015-2016)
- Kozhikode (2015-2016)
- Thrissur (2015-2016)
- Kottayam (2015-2016)
- Palakkad (2015-2016)
- Malappuram (2015-2016)
- Wayanad (2015-2016)

Rajasthan (1 city)

Sample Description

- Sample Frame = 31725
- Gross Sample Drawn = 931; SRS
- Sample Loss = 20.0 % ; Average Response Rate = 24.7 %
- Final Sample – 184 Establishments and 907 Records

Survey City (Year of Survey)

- Jaipur (2017-2018)

AWARDS AND RECOGNITION

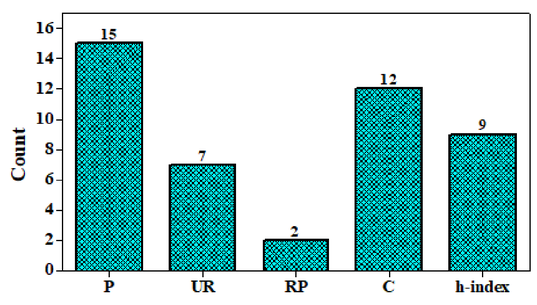
- **Handling Editor-** Transportation Research Record
- **Special Issue Editor-** Freight Automation, Logistics and Supply Chain: Transportation Research Record
- **Member-** Standing Committee on Freight Transportation Planning and Logistics (AT015), Transportation Research Board. The National Academies of Sciences, USA
- **PMRF Scholarship-** Aitichya Chandra
- **SLOCAT Young Leaders in Sustainable Transport 2020 and Assistant Professor, IIT BHU-** Agnivesh Pani
- **Best Paper Award from AT015-** Agnivesh Pani and Furqan Bhat: Freight Transportation Planning and Logistics, Transportation Research Board, Washington D.C., USA
- **Associate Research Centre/Partner-** Volvo Research Educational Foundation Centre of Excellence: Sustainable Urban Freight Systems

VISION 2021-2026

Development of a National Freight Transportation Planning Toolkit

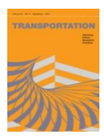
PUBLICATION SUMMARY (2018-2021)

- **Journals: 22**
  15 Published (P) + 7 Under Review (UR)
- **Working Papers (W)-** 3
- **Research Procedia (RP)-** 2
- **Conference Proceedings (C)-** 12
- **14 SCI- P** and **1 Scopus -P**



PUBLISHED PAPERS

Transportation (Impact Factor: 6.052)

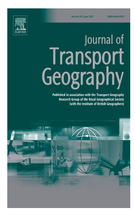


Sahu, P., Pani, A., 2020. *Freight generation and geographical effects: modelling freight needs of establishments in developing economies and analyzing their geographical disparities.* Transportation (Amst). 47(6), 2873–2902. https://doi.org/10.1007/s11116-019-09995-5

Transportation Research Part D: Trans. and Environ. (Impact Factor: 5.495)

Pani, A., Sahu, P., Holguín-Veras, J., 2021. *Examining the determinants of freight transport emissions using a fleet segmentation approach.* Trans. Res. Part D Transp. Environ. 92, 102726. https://doi.org/10.1016/j.trd.2021.102726

Journal of Transport Geography (Impact Factor: 4.986)



Chandra, A., Sharath, M.N., Pani, A., Sahu, P., 2021. *A multi-objective genetic algorithm approach to design optimal zoning systems for freight transportation planning.* J. Transp. Geogr. 92, 103037. https://doi.org/10.1016/j.jtrangeo.2021.103037

Pani, A., Sahu, P., Chandra, A., Sarkar, A.K., 2019. *Assessing the extent of modifiable areal unit problem in modelling freight (trip) generation: Relationship between zone design and model estimation results.* J. Transp. Geogr. 80, 102524. https://doi.org/10.1016/j.jtrangeo.2019.102524

Transport Policy (Impact Factor: 4.674)

Pani, A., Sahu, P., 2019. *Modelling non-response in establishment-based freight surveys: A sampling tool for statewide freight data collection in middle-income countries.* Transp. Policy. https://doi.org/10.1016/j.tranpol.2019.10.011

Pani, A., Sahu, P., 2019. *Planning, designing and conducting establishment-based freight surveys: A synthesis of the literature, case-study examples and recommendations for best practices in future surveys.* Transp. Policy 78, 58–75. https://doi.org/10.1016/j.tranpol.2019.04.006

Pani, A., Sahu, P., Patil, G.R., Sarkar, A.K., 2018. *Modelling urban freight generation: A case study of seven cities in Kerala , India.* Transp. Policy 69, 49–64. https://doi.org/10.1016/j.tranpol.2018.05.013

Research in Transportation Business Management (Impact Factor: 2.740)

Pani, A., Sahu, P., Majumdar, B.B., 2019. *Expenditure-based segmentation of freight travel markets: Identifying the determinants of freight transport expenditure for developing marketing strategies.* Res. Transp. Bus. Manag. 33, 100437. https://doi.org/10.1016/j.rtbm.2020.100437

Chandra, A., Pani, A., Sahu, P., Majumdar, B., and Sharma, S., 2021 *Identifying Large Freight Traffic Generators and Investigating the Impacts on Travel Characteristics and Expenditure Patterns: A Decision Tree Approach.* Res. Transp. Bus. Manag. https://doi.org/10.1016/j.rtbm.2021.100695

Network and Spatial Economics (Impact Factor: 2.538)

Pani, A., Sahu, P. Bhat, F.A.,2021 *Assessing the Spatial Transferability of Freight (Trip) Generation Models across and within States of India: Empirical Evidence and Implications for Benefit Transfer.* Netw Spat Econ 21, 465–493. https://doi.org/10.1007/s11067-021-09530-z

Transportation Research Record (Impact Factor: 1.686)

Pani, A., Bhat, F.A., Sahu, P., 2020. *Effects of Business Age and Size on Freight Demand: Decomposition Analysis of Indian Establishments.* Transp. Res. Rec. 2674, 112–126. **(AT015- Best Paper 2020)**. https://doi.org/10.1177/0361198120902432

Pani, A., Sahu, P., 2019. *Comparative Assessment of Industrial Classification Systems for Modeling Freight Production and Freight Trip Production.* Transp. Res. Rec. J. Transp. Res. Board 2673, 210–224. https://doi.org/10.1177%2F0361198119834300

Transportation Planning and Technology (Impact Factor: 1.375)

Sahu, P.K., Chandra, A., Pani, A., Majumdar, B.B., 2020. *Designing freight traffic analysis zones for metropolitan areas: identification of optimal scale for macro-level freight travel analysis.* Transp. Plan. Technol. 43, 620–637. https://doi.org/10.1080/03081060.2020.1780711

Journal of Urban Planning and Development (Impact Factor: 1.165)

Mohapatra, S., Pani, A., and Sahu, P., 2021. *Examining the Impacts of Logistics Sprawl on Freight Transportation in Indian Cities: Implications for Planning and Sustainable Development.* J. Urban Plan. Dev. DOI: 10.1061/(ASCE)UP.1943-5444.0000745

Journal of The Institution of Engineers (India): Series A (Impact Factor: 0.96)

Balla, B.S., Sahu, P., and Pani, A., 2021. *Are Freight Production Models Transferable between Urban and Suburban Areas? Guiding Model Transfer in Geographically Sprawling Indian Cities.* J. Inst. Eng. (India): A. DOI: 10.1007/s40030-021-00556-7