TRANSCOM 2025: 16th International Scientific Conference on Sustainable, Modern and Safe Transport

The Structure of Selected Household Expenditures on Recreation and Transport in V4 Countries

Margita Majerčáková[1], Emília Madudová[2]

1 University of Žilina, Univerzitná 8215, Žilina 025 01 Slovak Republic
2 University of Žilina, Univerzitná 8215, Žilina 025 01 Slovak Republic

INTRODUCTION

Backround information & Market Context

Elucidating the complex interplay between transportation and cultural expenditures can guide policymakers in crafting more nuanced and equilibrated approaches to urban planning, infrastructure development, and cultural enrichment.

Problem Statement & Stakeholders

The intricate relationship between transportation and cultural outlays can exert substantial influence on the tourism sector, which serves as a pivotal economic driver for numerous countries.

Research Objectives & Expected Impact

This paper explores the intricate relationship between household expenditures on recreation and transport within the Visegrád Group (V4) countries, utilizing hierarchical clustering analysis.

MATERIALS, METHODS & IMPLEMENTATION

The data were processed using a normality test and correlation analysis. Based on the results of the normality test, Kendall's tau-b correlation analysis was applied, which is appropriate for non-parametric testing and smaller research samples. After confirming the data's distribution with normality tests, we applied Kendall's tau-b correlation analysis, a non-parametric method suitable for our data's characteristics, to explore the strength and direction of relationships between variables. Subsequently, cluster analysis was conducted. Cluster analysis is a multivariate statistical technique employed to group observations based on their similarities. Hierarchical clustering represents a prevalent method within cluster analysis that constructs a hierarchy of clusters through successive merging (agglomerative) or splitting (divisive) of data points. The results are visually represented utilizing a dendrogram, a tree-like diagram illustrating how clusters are combined at different levels of similarity or distance.

RESULTS

The correlation analysis of transportation-related variables in four Central European countries reveals diverse patterns. The Czech Republic shows strong positive correlations between railway passenger transport and both road and combined passenger transport. Poland exhibits strong correlations between various transport expenditures, including road, railway, and insurance. Hungary demonstrates strong correlations between insurance expenditures and railway, road, and combined passenger transport expenditures. Slovakia only shows a strong correlation between road and railway passenger expenditures. These findings, based on Kendall's tau-b correlation coefficient, highlight the varying relationships between transportation modes and expenditures across these countries. Passenger transport by railway cluster (Figu (PolandOPTS, SlovakiaOPTS, .1)HungaryOPTS, CzechiaOPTS) exhibits initial merging. This indicates a high degree of similarity among the four countries, at least in relation to other categories. Subsequently, all transport categories (OPTS, CPT, R, Ro, ICT) ultimately coalesce into a single branch, demonstrating their closer affinity compared to recreation & culture. Within RECUL, the dendrogram typically displays smaller rescaled distances for PolandRECUL and SlovakiaRECUL (which merge initially), followed by HungaryRECUL, and lastly CzechiaRECUL. This hierarchical ordering suggests that Poland and Slovakia demonstrate the highest similarity in their recreation and culture expenditure patterns, Hungary exhibits reasonable proximity to them, and Czechia presents slightly more distinctive characteristics—although all four nations still constitute one coherent RECUL cluster.

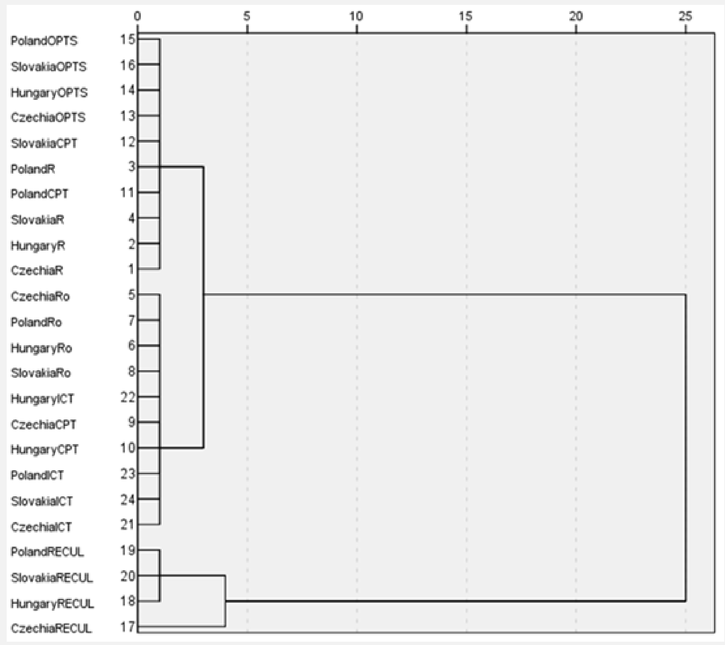

Fig. 1 Dendogram

CONCLUSION & IMPLEMENTATION PATH

The consistent clustering pattern observed across transport categories suggests a degree of regional integration or similarity in transportation infrastructure and usage among these Central European countries. This cohesion in transport-related expenditures contrasts with the more varied patterns seen in recreation and culture spending, potentially reflecting differences in cultural priorities or economic factors influencing leisure activities.

The unique position of Czech Republic within the recreation and culture cluster might be attributed to distinct cultural policies, demographic factors, or economic conditions that set it slightly apart from its neighbors in terms of recreation and culture expenditures. This clustering analysis reveals important insights into the economic and cultural dynamics of Central European countries, highlighting both similarities and distinctions in their spending patterns.

ACKNOWLEDGEMENTS

This paper was prepared under the grant support of VEGA project 1/0333/24 and KS 2025 Institutional Research.