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PROJECT REPORT

SOCIAL NETWORK ANALYSIS OF GLOBAL TRADE: IDENTIFYING COMMUNITIES, CENTRAL COUNTRIES, AND STABLE PARTNERSHIPS

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ABSTRACT

Global trade is a key foundation of the world economy that forms a dynamic and interconnected network. However, structural analyses of these networks are limited. Understanding how the community of trading nations forms, develops, and changes from a network perspective still leaves many gaps. This research addresses three main issues: how communities in the global trade network form and change over time, which countries have the most strategic influence, and which trading partners exhibit the most consistent relationships. The study focuses on a weighted undirected trade network graph based on total trade value, ignoring product type or sector. Communities were analysed using the Leiden algorithm and Louvain Algorithm, while the influence of each country was determined through betweenness and closeness centrality measures. The research also identifies countries with strategic roles and assesses the consistency of bilateral trade relations over the period 2019 to 2024. The data is annual bilateral trade data from UN Comtrade, cleaned and aggregated into three two year periods, modelled as an undirected weighted graph where countries are nodes and trade relationships are edges weighted by trade values. Analyses were conducted using the Leiden algorithm for community detection, centrality metrics for influential countries, and consistency analysis for stable trade pairs. The results show that four stable community structures emerge consistently across periods, with China identified as the most central country, and Canada-United States as the most consistent bilateral trade partnership.

Keywords: International Trade, Social Network Analysis, Community, Country Influence, Trade Consistency