

Abstract

Imperatives for the advancement of freight intermodalism in South Africa: A systems thinking approach

Please note: The researcher is currently finalising her doctoral thesis in the management of technology and innovation for examination. The paper is still to be reviewed and examined.

Background

Transport and logistics systems in South Africa have evolved where industry is over-reliant on road-only modes of transport. This results in road arteries being over-burdened and congested with heavy freight vehicles, while rail corridors are not utilised to design capacity and roads condition is deteriorating. This modal imbalance leads to negative consequences being perpetuated. A concern, seldom addressed, is that modal distortions place pressure on nodal points – port and inland container terminals, border posts and maritime ports – and their capacity to seamlessly connect parts of the chain. This hinders efficiencies of nodes and the integrated system. The overall cost of logistics is high and inefficiencies severely detract from South Africa's supply chain resilience, competitiveness; economic performance; social and environmental sustainability.

Objective

The objective of the study was to explore the extent and manner in which the development and implementation of intermodal freight systems and improved interactions between actors could contribute to alleviating systemic challenges, and support better national outcomes.

Methodology

The study adopted a systems thinking paradigm, deemed an apt approach for a holistic study of a connected system. Data was collected for this qualitative study through multiple methods: Documentary analysis of actor organisations and South African industry developments; Engaging in semi-structured interviews with ten individuals who are deemed to be experts in South Africa's transport and logistics system; Conducting two facilitated focus groups of freight system actors, serving as a proxy of South Africa's intermodal system. Data was analysed using thematic analysis which generated six themes that lead to a proposed conceptual framework for application and to recommended imperatives for freight intermodal system advancement.

Findings

Challenges were found to be systemic in an immature system. Participants indicated that improved intermodalism has the potential to advance transport and logistics system performance. Imperatives require structural and institutional interventions. In a country where capability, capacity and financial resources are constrained, modular implementation programme approaches were recommended to prioritise and potentially replicate models guided by a vision for the country's transport and logistics system. The key finding was that much improvement could be leveraged, not merely by improving system parts such as rail performance or roads condition, but rather by directing interventions to the improvement of the key *interfaces* between system parts – places where integration and harmonisation could promote corridor intermodal outputs and drive value. The collective pursuit of such system purpose is a means to unite system actors for improved system performance. The systemic and continuous fusion of technology, people and innovation is needed to advance vital

coordination, cooperation and collaboration amongst actors to pursue and realise benefits for all. It would be advisable to develop an integrated performance framework that focuses specifically on the integration and interfaces between intermodal system parts (as opposed to a sum of the performance of the parts).

Conclusion

The researcher is of the view that the novel contribution of the study is founded in conducting focus groups – as a proxy representation of actors in South Africa's real freight intermodal system – to illustrate the value of applying a systems thinking approach to the phenomenon of freight intermodalism. Focus group interaction reflected the willingness of key actors to collaborate, cooperate and coordinate to advance system performance.

Uniqueness of the contribution to freight intermodalism, lies specifically in the focus on system interfaces. The development of relationships to optimise the core interfaces can be used to prioritise and leverage potential interventions and to focus performance measurement. The study may have relevance for potential application by freight intermodal industry and system actors, policy makers, academics, lobbyists and interest groups to garner support for intermodalism in the freight and logistics industry, and within the communities that it affects. It is in the interests of the country to advance freight intermodal practices to contribute to increased resilience of supply chains, the economic performance of South Africa, its environment and its people.

Key Words: Intermodal Freight; Systems Thinking; Interfaces; Collaborate; Cooperate; Coordinate