Food Convergent Innovation in Dairy Businesses and Sector: Multi-Indicator Supply Chain Management Framework and Traceability Requirements

Byomkesh Talukder1,2, Laurette Dube3 and Keith W. Hipel1

1Déan Institute for Global Health Research, York University, Canada.
2Déaxa Institute for Global Health Research, York University, Canada.
3Conflict Analysis Group, Department of Systems Design Engineering, University of Waterloo, Canada; Centre for International Governance Innovation and Balsillie School of International Affairs, Waterloo, Canada.

Introduction

Supply chain of dairy businesses and sector is very complex and dynamic as portrayed in the righthand figure. The traceability of the dairy supply chain requires a multi-indicator based monitoring systems. Hence, the main objective of the paper is to develop a holistic framework for dairy business decision support tool that assemble Key Performance Indicators (KPIs) building upon existing research and practice of supply chain paradigms assembled under the food convergent innovation (FCI) umbrella, i.e., lean, agile, green, resilient and nutritious. FCI is a metaparadigm that allows integrating multiple indicators to open new frontiers for commercial innovation, supply chains and market systems. FCI places convergence of economic, health, social and environmental outcome indicators as target of both business decisions and those of actors throughout society that can contribute to supply and demand for such a convergent outcome.

Methodology

A systematic literature review was combined with participant observation with supply chain management and personnel in a large dairy company. Experts reviewed essential traceability indicators, their parameters, threshold values and weighting of the indicators. A Multi Criteria Decision Analysis (MCDA) framework was then used for developing the framework for ensuring traceability of the supply chain.

Results

The study identifies a set of essential indicators and their measurement techniques. The systemic data collection and integration of these indicators into an integrative decision-making tool for convergent innovation requires significant advances in traceability science and technology as well as in the integration of these into existing operational and management information systems. The framework suggests step by step procedures to develop a dashboard for tracking the performance of the indicators.

Discussion and Conclusions

The proposed analytical framework is to be empirically validated and pilot tested for its ability to systematically evaluate and improve the dairy supply chain from end-to-end. This paper address challenges and possibilities in mainstreaming this approach to dairy supply chain in different institutional contexts and its generalizability to other agri-food sectors that altogether contributes to food security, safety, human and environmental health around the world.