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Benchmarking Agri-food Supply Chains: A Case of Pakistan and New Zealand Milk Systems

A thesis presented in partial fulfilment of the requirements for the degree of

Doctor of Philosophy
in
Logistics and Supply Chain Management

at Massey University, Palmerston North, New Zealand.

MASSEY
UNIVERSITY

Muhammad Moazzam

2015

DECLARATION

I, Muhammad Moazzam, declare that this thesis entitled "*Learning Lessons Through Benchmarking: A Benchmarking Study of Milk Supply Chain Networks of Pakistan and New Zealand"* submitted to the Massey University for the degree of Doctor of Philosophy is the outcome of my own research work. Acknowledgement is given where material from other resources was used. I also certify that the thesis has not been presented, in whole or partly, for any degrees or diplomas.

Signed……..….

Student ID: 08532664

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ABSTRACT

Businesses are now operating as parts of collaborative networks sharing skills and information synergistically to offer superior value to the customers. In order to stay competitive or surpass competitors, businesses benchmark their performance against industry leaders or best-in-class competitors. A benchmarking study aimed to examine the causes of poor performance of the milk supply chain in Pakistan was undertaken. Fo this purpose the performance of key players of milk supply chain in Pakistan was benchmarked against those of New Zealand. An extensive review of literature was conducted with the objective to choose an appropriate performance measurement framework. For this purpose existing frameworks were evaluated against five criteria characterising performance measurement in agri-food supply chains and not a single framework qualified. This research gap was abridged by developing a framework based on supply chain operations reference (SCOR) model but with certain modifications to food quality.

Pragmatic approach was used to select appropriate research design. Cross-sectional data was collected using survey strategy. A total of 490 respondents were accessed through personal interviews (430 in Pakistan) and online questionnaires (60 in New Zealand). Samples were drawn using a combination of multi-stage and purposive sampling methods. A three-step approach was proposed to address the individual objectives of the overall study. The first-step was to conduct value chain analysis of both the milk supply chains. The second-step was to measure the performance of key players of both the milk supply chains using the performance measurement framework developed as a result of literature review. The third-step was to perform gap analysis of the SCOR metrics for key players of both the milk supply chains and suggest appropriate policy measures for the improvement of milk Supply chain in Pakistan. The data were analysed with statistical package for social scientists (SPSS) and Microsoft Excel.

The value chain analysis was performed to explore the benchmarking milk supply chains as well as to gauge the level of vale addition. The value chain maps discussed the primary functions, activities, operators, facilitators, and enablers in the milk supply chains in Pakistan and New Zealand. Moreover, the analysis of value distribution along the entire chain indicated that the informal chain of milk (unprocessed milk) in Pakistan had 22.39% ex-farm gate value addition, with the largest (almost 82%) share of the value captured by the dairy farmers. Whereas, the formal chain of milk (processed milk)

in Pakistan had 104.23% ex-farm gate value addition, with the largest (51%) share of the value captured by the dairy farmers. The milk supply chain in New Zealand had 216.83% ex-farm gate value addition, with the largest (55.6%) share of value captured by the retailers.

The findings of the gap analysis were:

- Pakistani dairy farmers under performed in supply chain reliability, cost of production, and return on working capital as compare to NZ dairy farmers. The majority of the Pakistani dairy farmers were smallholders and due to diseconomies of the scale of their operation they could not afford modern dairy farming technologies such automatic milking, milk storage at controlled temperature, and other precision dairy farming (PDF) technologies.
- The Pakistani milk collectors underperformed in perfect order fulfilment, flexibility and cost of milk sold and outperformed in value at risk, SCM cost and return on assets as compared to NZ dairy companies.
- The Pakistani milk shops underperformed in cost of milk sold and outperformed in order fulfilment cycle time, flexibility, value at risk, SCM cost and return on assets as compared to NZ dairy companies.
- The Pakistani dairy companies underperformed in perfect order fulfilment and flexibility as compared to NZ dairy companies.

On the basis of findings of the value chain analysis, SCOR analysis, and gap analysis, promotion of agricultural cooperatives as a phased-out medium to long term policy intervension was recommended.

ACKNOWLEDGEMENT

In the name of Almighty God, the Gracious and the Affectionate who bestowed me with the opportunity to complete this thesis. I feel short of words to express my sincere gratitude to my supervisors Dr. Norman E. Marr and Dr. Elena Garnevska for their auspicious guidance, encouragement, advice, and support in my academic as well as personal endeavours. Norman's visionary leadership and extensive experience in logistics and supply chain industry have truly benefited this research work right from choosing the topic and methodology through to the completion of the thesis.

I would like to acknowledge the Higher Education Commission (HEC), Pakistan for the financial support in the form of *MS leading to PhD Scholarship*. Moreover, I am thankful to Massey University for providing excellent research facilities and working environment. Thanks also to 'The Claude McCarthy Fellowships' who provided me financial support to present my research work at Cranfield University, UK. Furthermore, I feel indebted to Nicola Shadbolt (Director, Fonterra and Chair in Farm Management, Massey University, New Zealand), Abdul Ghafoor (Assistant Professor, University of Agriculture, Faisalabad, Pakistan), Tom Phillips (Senior Tutor, Center of Excellence in Farm Business Management, Massey University, New Zealand), Irfan Habib (Dairy Solutions, New Zealand), Muhammad Imran Siddique (fellow PhD student), Zaka Ullah (fellow PhD student), and Zafar Iqbal (fellow PhD student) for their guidance and support.

I would also like to pay my gratitude to the research participants from Pakistan as well as New Zealand who donated priceless time from their busy schedules. Finally, how can I forget to acknowledge my wife (Shamsa), son (Arham), and daughter (Meerab) for their affection and support through thick and thin.

Lastly, I dedicate this piece of work to my parents for their unconditional love and source of inspiration.

Muhammad Moazzam

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