Decision support framework for the Sustainability of Traditional Brass Industry – A Sri Lankan case study

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Abstract

Sri Lankan traditional industries have been existed for centuries which provides considerable employment and livelihood for rural community. Since there are not adequate researches taken place in this sector, existence in the future has hampered due to lack of adaptation of latest development in manufacturing technology and business models. Therefore, industrialists struggle in decision making process in terms of costing and scaling of environmental impact and social issues. Since the Brass Manufacturing is one of the major traditional industries in Sri Lanka, this research focuses on to develop a decision making framework for costing and environmental management aspects which are essential for sustainability of this industry. This framework is based on Value Stream mapping and Life Cycle Principles for Manufacturing costing tool and environmental impact assessment. A detail study has been conducted while closely monitoring the material flow, information flow and decision making methods to develop value stream which reflects the cross section of industry. Life Cycle Costing procedure is used to develop the costing tool. Life Cycle Impact Assessment was done with SimaPro which replicates the impact on environment on current practices. This framework can be used for decision making on introducing new designs and products to the market and to adapt better environmental practices.

Keywords
Brass Manufacturing, Value Stream, LCC, LCIA
Biography

K.G.S.P. Karunarathna is a final year Production Engineering undergraduate at the Faculty of Engineering, University of Peradeniya. He has successfully completed an advanced certificate courses in Human Resource Management and Business Management in between his undergraduate period. He interested in CAD/CAM, Projects, Research & Development, Industrial Engineering and Sustainable Manufacturing. He is a student member of IESL and affiliate member of IMechE Sri Lanka.

H. M. M. M Jayawickrama is a research assistant in the Department of Production Engineering at the University of Peradeniya, Sri Lanka. He earned Bachelors in Production Engineering from University of Peradeniya, Sri Lanka in 2013. Soon after he joined to Department of Production Engineering at the University of Peradeniya as a temporary instructor. Currently he is following an MPhil degree in Manufacturing Engineering at University of Peradeniya. He has published 5 publications including a paper won the best track paper award in Lean and Six sigma track at IEOM 2014. His research interests include lean and sustainable manufacturing, Industrial Engineering. He is a member of the advisory committee of IEOM student chapter Sri Lanka.

M. Dharmawardhana received B.Sc. Eng. Specialised in Production Engineering from University of Peradeniya, Sri Lanka. After the graduation he joined to the same department as an instructor. Later he joined to Royal Ceramics Lanka (Pvt.) Limited and started their first factory at Eheliyagoda. One year after commissioning the factory he joined Elastomeric Tools and Dies (Pvt.) Ltd. where CAD/CAM facilities are used to design and manufacture dies and moulds. Later he joined to the Department of Production Engineering, Faculty of Engineering at University of Peradeniya as a Teaching Assistant. He earned Master of Science degree from National Formosa University, Taiwan in 2011. Currently he is currently attached to the same department as a Lecturer.

Asela K. Kulatunga is a senior lecturer in the Department of Production Engineering at the Faculty of Engineering, University of Peradeniya, Sri Lanka. He earned Bachelors in Production Engineering from University of Peradeniya, Sri Lanka and PhD in Mechanical/ Industrial Engineering from University of Technology, Sydney, Australia. He has published more than 50 books/book chapters, journal and conference papers. Dr. Kulatunga has carried out various research projects with local manufacturing and service sectors. He is currently serving as a co-drafter for organizational LCA, for UNEP/SETAC Life Cycle Initiative. His research interests include lean and sustainable manufacturing, Industrial Engineering. He is the country representative for IEOM in Sri Lanka. He also holds membership at IEEE, ERSCP, and associate membership IESL.