

**REMANUFACTURE FOR SUSTAINABILITY: ASSESSMENT
OF BARRIERS AND DEVELOPMENT OF SOLUTIONS TO
PROMOTE LOCAL AND REGIONAL AUTOMOTIVE
REMANUFACTURING**

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Degree of Master of Science

Department of Mechanical Engineering

University of Moratuwa

Sri Lanka

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Thesis submitted in partial fulfilment of the requirements for the Degree Master of Science in
Mechanical Engineering

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DECLARATION

I hereby solemnly declare that this thesis is based on my own work and the thesis is prepared by myself and it does not contain neither any material previously submitted for a Degree or Diploma in any other University or institute of Higher learning nor any material previously published or written by another person without acknowledgement.

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Date: 27/05/2020

CERTIFICATION

The above candidate has carried out research for the Masters' Thesis under our supervision.

Name of the main supervisor: Dr. J.R.Gamage

Signature of the supervisor: Date:

Name of the second supervisor: Dr. H.K.G. Punchihewa

Signature of the supervisor: Date:

LIST OF PUBLICATIONS

1. H. Gunasekara, J. Gamage, and H. Punchihewa, “Remanufacture for Sustainability: A review of the barriers and the solutions to promote remanufacturing,” Int. Conf. Prod. Oper. Manag. Soc, December, pp. 1–7, 2018. <https://doi.org/10.1109/POMS.2018.8629474>
2. H. Gunasekara, J. Gamage, and H. Punchihewa, “Remanufacture for Sustainability: Barriers ad solution to promote automotive remanufacturing” Global Conference of Sustainable Manufacturing, October, 2019. <https://doi.org/10.1016/j.promfg.2020.02.146>
3. H. Gunasekara, J. Gamage, and H. Punchihewa, “Remanufacture for Sustainability: Developing a remanufacturability index and business model for automotive parts remanufacturing” Journal of Cleaner Production– Submitted for review - Pending acceptance

ABSTRACT

Remanufacturing is the only end-of-life process where used products are brought back to the Original Equipment Manufacturers' (OEM) performance specification from the customers' perspective. At the same time, it offers a warranty equal or better to that of corresponding new products. During this process, products are returned to their original state with minimum waste of material and energy. Moreover, the benefits of remanufacturing are not only limited to ecological aspects but also it provides benefits for both the customer and the remanufacturer.

There are barriers which hinder the remanufacturing activities globally. Thus, the purpose of this research is to investigate the present barriers of remanufacturing and propose solutions to the major barriers pertinent to the automotive remanufacturing industry in Sri Lanka. Thematic analysis of related literature, Semi-structured interviews, and industrial case studies was conducted to identify the barriers. Pair-wise comparison was used to prioritise them. The prioritised barriers were listed out, and solutions are proposed to promote local/regional automotive remanufacturing.

Moreover, this research develops a business model for automotive parts remanufacturing by identifying suitable automotive parts. Initially, a review of the basic business components of a remanufacturing business was investigated. Then, a survey on the eBay online marketplace and local markets were performed to develop a Remanufacturability Index (RI) for automotive parts. Thematic analysis of related literature with the Business Model Canvas was integrated to generate the business model. These findings are significant for the entrepreneurs, other stakeholders of automotive parts remanufacturing business and other interest groups.

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