

Executive Summary

- **Importance of this study (why this study)**

As per the facts and figures mentioned earlier, India has all the favorable conditions like enormous market growth, demand for remanufactured products, price sensitive market etc. for initiating remanufacturing business, but still it is yet to get its acceptance as an organized business sector. With this backdrop, this research project is carried out on remanufacturing of products to seek answers to the following questions.

- a) Why many Indian manufacturers are still not interested in remanufacturing their products?
- b) What are the critical indicators for a successful remanufacturing business?
- c) What are the possible enablers that can possibly motivate the industry for adopting remanufacturing?

Previous studies are based on either opinion from experts or research framework meant for other countries. In fact, we require an exclusive study that addresses the Indian business environment and identify the success factors for Indian remanufacturing business. This research project is a maiden attempt to initiate such a study for developing a framework of critical success factors of Indian remanufacturing business through a case study based approach of successful remanufacturers in India.

- **Objectives of the study**

The research study is based on case studies of 10 to 15 remanufacturing companies from different sectors in India. While carrying out each of the case study, the following objectives are to be addressed.

- Study the various business operations of the selected remanufacturing company and develop a process flow diagram of the existing operations.
 - Study the technological infrastructure required for its implementation.
 - Identification of the key issues which are relevant to the remanufacturing business.
 - Identification of the critical indicators for a successful remanufacturing business.
- **Methodology details (how this study was carried out)**

The study was carried out in the following way:

- (i) The list of Indian remanufacturing companies were contacted and request letters were send to conduct case studies in their plants. 12 of them initially agreed to the proposal.
- (ii) Seven case studies in the following companies are completed
 - a. Volvo Reman India Pvt. Ltd., Peenya, Bengaluru
 - b. Printech Solutions India Pvt. Ltd., Jayanagar, Bengaluru
 - c. 4R recycling Pvt. Ltd., Bengaluru.
 - d. Reman Infrastructure Pvt. Ltd., Namakkal, Tamil Nadu.
 - e. Eco Recycling Limited, Andheri (E), Mumbai
 - f. Texcool Limited, Cuffe Parade Mumbai
 - g. Bijoy Engineering Works, Dhanbad

Due to COVID-19 and travel restrictions many companies did not agree to further continue with the study, so we finally ended with the 7 case studies.

- (iii) Each case study is being carried out with one-week visit to the company and understand their process of remanufacturing, labour employment, their financial and other business performance, critical success factors, etc. The primary data is

collected through interviews and filling open-ended and unstructured questionnaires.

- (iv) Some of the unique operations and technology needed to be given due emphasis, are the *acquisition process of cores, reverse logistics, disassembly, cleaning, inspection and testing, special tools and machines, technology, design for remanufacturing, reassembly and marketing.*
- (v) Process flow diagram to be constructed, which will help to summarize various technical and operation issues.
- (vi) From the study, we could identify the issues which are relevant to their remanufacturing process. These issues are listed down and their importance are rated using 5-point Likert scale.
- (vii) The critical ones needs to be identified, based on which the success of the remanufacturing business will depend.

- **Results & Discussions (what the study reveals)**

The data from all of the 7 case studies indicate few major findings which are discussed in the below section.

- It has been seen that most of the companies operate in small scale businesses with an annual turnover from Rs. 1 to 10 crores. These companies generate employment of 10 to 50 employees. These workers range from skilled to semi-skilled persons.
- The products which are popularly remanufactured are automotive parts and components, machine tools, industrial machines, transformers, pumps, printer cartridges and recycling of e-wastes.

- All the seven companies have responded that remanufacturing is a profitable business option in India. The profit percentage range from 3% to 37%. However, they also responded that building green image among customers is also a secondary reason.
- All the companies mention that the remanufacturing business decisions are mainly centred around 10 prime factors as, Acquisition process of used products, disassembly issues, cleaning issues, sorting issues, inspection issues, reassembly issues, design issues, inventory issues, marketing issues, and government policies. Further these ten factors are sub-divided into several items, so that a detailed decision-framework can be established. The success of the remanufacturing business lies in how the company efficiently manages these set of decision issues.
- Intervention of Government and other managerial policies are also impacting the remanufacturing industries. Prevention and control of pollution are one of the crucial issues that have to be considered not only among the remanufacturing industries but also in every sector. Similarly, laws related to environmental protection and the restriction of the usage of hazardous products are also important issues marked by 90 % of the industries.
- One of the biggest portions of the total expenditure that every remanufacturing industry invests in New Technology/Machine/Capital. It is on an average of 25-30%.

- **Policy implication, suggestions & recommendations**

- Most of the remanufacturing companies are operating as a small scale business, with an annual turnover of Rs. 1 to 10 crores. The number of employees range from 10 to 50. Moreover, we found that the technology/capital cost of these companies contributes on an average of 30%. Thus, under such a situation governmental support of soft loans can boost such industry. This would further generate employment in the country.
- Since, sorting and inspection activities are found to be the most critical activities in remanufacturing business, skilled manpower requirement is more. Training and skill development programs may be initiated in these areas. Moreover, in remanufacturing determination of remaining life of used products is one of the difficult task. Special technology is required for determination of residual life and inspection due to safety and reliability issues of the product design. Research initiatives in this area is highly recommended.
- Most of these companies abide by all the governmental laws related to Environmental Protection Act, but they put forward a point that they are not allowed participate in governmental contracts due to the fact that they are selling remanufactured product.
- A social awareness program is required from the end of the government, as most of the company feels that though they are contribution to the society in reducing environmental pollution by reuse of waste material, they are still not considered as the mainstream business or not a part of organised business sector. Government should think of initiating a separate policy for promoting a healthy remanufacturing business.