Selection and Analysis of Technologies Developed for the Base of the Economic Pyramid

by

Suraj Bhat

Department of Mechanical Engineering

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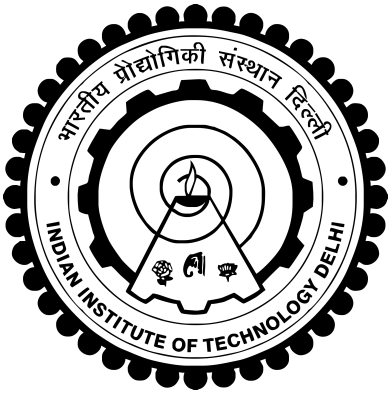

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ABSTRACT

The economic wealth of the entire adult population of the world can be represented in the form of a pyramid, where the majority are a part of the wider base of the pyramid. More than half of the world's adult population can be classified as the 'Base of the (economic) Pyramid' (BoP). The needs and constraints for the BoP are largely different from those at the top. Most of the BoP live in a resource-constrained environment where the spending habits and overall resource allocations are prioritised differently.

Technology plays an important role in poverty alleviation and the overall development of the society. However, most of the technology is designed for the top of the pyramid. As a result, poverty alleviation efforts through technology interventions often fail or have minimal impact. This is evident when one looks at the number of devices sent as aid to developing countries which are lying unused.

With multiple technologies being developed as a result of developmental efforts worldwide, it becomes important that the right and appropriate technology reaches the user. In this thesis, using the design literature and field experiences, relevant technology attributes were identified and using multiple-attribute based decision-making techniques, a methodology has been proposed to rank the technology alternatives for various use-case scenarios. The methodology is demonstrated with some of the technologies developed for the BoP sector.

Further, design and realistic dynamic analysis of some BoP technologies were attempted to validate their suitability in a given context while considering the various socio-technical constraints encountered in a resource-constrained environment. In this, structural analyses have been carried out for two different technologies. Ergonomics was also considered one of the factors for the multi-body dynamics analysis of a Treadle pump. Similarly, constraints

such as manufacturing facilities with larger tolerances were considered, and the effects of joint clearances were analysed. The limitations of designing with constraints were then addressed by formulating it as a design optimisation problem.

Finally, it is concluded that a suitable framework was attempted for the selection and analysis of technologies for resource-constrained settings using advanced analysis tools. Appropriate choices of technologies and optimised designs lead to increased adoption of technologies, because of which, the users at the BoP can reap its economic benefits.

Keywords: technology selection, design for BoP, design for the developing world, design analysis, design optimisation