Proceedings of the 2019 International Conference on Industrial Engineering,
Quito, Ecuador
February 20-22, 2019

Applied Statistics in a New Product Development: A Pedal-Powered Washing Machine Design for People with Scarce Resources

Annel Saavedra, Carolina Chávez, Alejandra Mafla, Carolina Cabezas, and Danny Navarrete

Universidad San Francisco de Quito, Ecuador

Corresponding author's Email: norma.chavez@estud.usfq.edu.ec, annel.saavedra@estud.usfq.edu.ec, alejandra.mafla@estud.usfq.edu.ec, scabezas@usfq.edu.ec, dnavarrete@usfq.edu.ec

Abstract: The toolbox of an industrial engineer does not only apply to improve the productivity and efficiency of any company, but it can also be used to make an impact to society. Consider the case of Ecuador, where about 23 % of the population lives in poverty, which means, among other things, that there is little or no access to basic services such as water and electricity (INEC, 2017). Most of these people spend a lot of time washing their clothes by hand and travelling to the nearest river to perform this activity. Thus, an opportunity was identified to create a new product that can satisfy the needs of this group of people. The present study shows an application of several industrial engineering tools to design a new product: GiraExpress, a low cost washing machine that functions when the user presses the pedals, and thus, it does not require electricity. First, focus groups were organized where targeted consumers defined the following characteristics as most important: size, pedals, wheels and price. Then, conjoint analysis was performed to further determine a detailed list of attributes that are significant to potential consumers: two wheels, two pedals, one-meter height and a $40 price. The next step was to develop two prototypes to conduct consumer tests. This was done by taking a statistical sample of the consumers testing each of the two prototypes based on four criteria: cleanliness, performance, comfort and likability. Once all the data was obtained, a mixed model was performed through an analysis of variance and a Tukey test, in order to find out which prototype was better. The overall result shows that the prototype with two pedals is the most liked by the consumers. The product received positive feedback and currently, the prototype is undergoing further improvements since it will start being manufactured as the Community Outreach Project of the Industrial Engineering Department of the USFQ, with the goal of helping communities with scarce resources.

Keywords: new product, washing machine, applied statistics, impact to society

ISBN: 97819384961-5-8