INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

Name of the Student : ZUK NECHEMIA TURBOVICH

Roll Number : **136105010**

Programme of Study : Ph.D.

Thesis Title: **Design Methodology for Product Designers in the Context of Personal 3D Printing**

Name of Thesis Supervisor(s) : Prof. Amarendra Kumar Das, Dr. Pratul Chandra Kalita

Thesis Submitted to the Department/ Center : DESIGN

Date of completion of Thesis Viva-Voce Exam : 6 APRIL 2018

Key words for description of Thesis Work : 3D Printing, Design Methodology, Mass Customization, User Involvement, Additive Manufacturing, Design Management

SHORT ABSTRACT

Many literary and other informative sources refer to 3D printing technologies as one of the generators of the next industrial revolution. Alongside the expansion of the variety of the manufacturing means for industrialists, for the first time in human history, the common people get the chance to own an automatic manufacturing machine that has a potential to dramatically change the way of how they purchase and interact with sustainable products. In recent years, desktop personal 3D printers have become available for sale throughout the Internet, and despite that the common people have not found interest in these revolutionary machines. The prime motivation for this doctoral research was derived from an attempt to understand the reasons for the clear gap that exists between the market, which offers affordable personal 3D printers (P3DP) to the potential customers that do not show any willingness to buy these machines. The definitive goal of this research was to establish a product design methodology for products that are supposed to be manufactured by P3DPs, so that product designers will truly understand the possibilities and the limitations in this context and will be able to contribute their part in enhancing the personal 3D printing field. The research included a literature review that reviewed literary sources from 3D printing, product design methodologies, mass-customization, and user involvement fields. The literature review revealed few insights in regard to market faults that derive from lack of standardization and assisted to establish the theoretical basis of the research questionnaire that was conducted as part of this research. The questionnaire was designed to examine how the common people perceive P3DPs, and the analysis of it has revealed few interesting complicated insights that shed more light on the reasons that cause the mentioned gap. Further to the questionnaire, the research included a comprehensive market review that examined free CAD software and websites that offer products that are supposed to be manufactured by P3DPs, and industrial 3DPs. Conclusions and insights that emerged from the market review, have become to be substantial factors that came to an expression at the establishment of the definitive methodology.