Chapter 1
3D Printing as a Case of Disruptive Technology:
Market Leverage and Strategic Risks for Traditional Manufacturing

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ABSTRACT

Disruptive innovation is a powerful tool for broadening and developing new markets and providing new product functionality, which, in turn, may disrupt existing markets, platforms and ecosystems. From the case of 3D printing technology, we find a clear example of disruptive technology. This chapter examines how disruptive the technology of 3D printing on the strategic scope of manufacturing activities in terms of product scope, market scope, geographical scope, and competence scope.

INTRODUCTION

In an environment where innovation drives a fundamental objective in developing a competitive position of developed and heavily industrialized economies, disruptive technologies offer a strategic option of profoundly transforming the manner and process in which goods are manufactured (Seidle, 2015). Therefore, disruptive technology is far associated with successful technology also known as "technological success", which emerges to take the place of already dominating technologies and innovations in the 3D printing market (Capdevila, 2015).

Chris Anderson observes the current revolution and dynamic emergence of 3D Printing technologies as a part of post-modern industrial revolution. In this regard, developed economies are making substantial investment in 3D printing sector (Leila and Beaudry, 2015). According to Cutting et al., (2015), there is an upsurge in the perception among business practitioners, leading scholars and industry influencers that these technologies will create a new phase of technology consumption and embracement, that could be linked to an emergence of next generation entrepreneurs, exciting business opportunities and as well as new business models altogether.

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For instance, in the United States investments plan of 2013, President Barack Obama, cited, that America and its leading innovation companies should invest in the creation of 3D printing center to revive the innovation front and create more job opportunities (McKinsey & Company, 2013). On this front, European economies have proactively moved to forge an entry into the sector of 3D Printing technologies. Commencing January 2013, the project "*European Amaze of Spatial Agency*", was developed to shift the focus on the creation of mobility within 3D printing for all industrial, collapsible segments in the aerospace sector and other commercial divisions of advanced composite materials (Smith, 2015).

According to Christen & Raynor (2016), "…disruption has a paralyzing effect on industry leaders. With resource allocation processes designed and perfected to support sustaining innovations, managers are constitutionally unable to respond to the emerging trends and challenges in the disruptive process…" This research finds that although these threats and trends are considered to be inferior when measured against value propositions on which sustaining innovation has been focused, these disruptive technologies have other hidden functional attributes such as being less expensive, simpler and more convenient. Thus, from the value of disruptive innovation theory, managers should be to adopt disruptive technologies to improve on the sustaining innovation process of their companies and in the long run sustain their competitive position in the market.

LITERATURE REVIEW

Exploring 3D Disruptive Technologies

This chapter highlights the fact that the 3D disruptive technologies have proved to have different meaning according to authors (Yu and Hang, 2011). In a more general perspective, research on the concept revealed certain criticisms in particular as to the definition of the disruptive character of the technologies identified by Christensen (Rao & Cull, 2006). According to these authors, one of the criticisms on 3D printing concept results from the fact that the analyses which research has, are essentially ex-ante and that the robustness of the concept of 3D disruptive technologies remain weak to study and forecast disruption. The fragile attribute of the predictability of 3D printing concept regarding disruption ability highlights the necessity for studying this phenomenon in a finer and detailed way to take into account the variety of strategic impact of disruptive technologies with a more structured categorization. In line with this, the researcher studies Adner et al., (2002) proposed methodology to better understand the disruptive process when disruptive technologies appear in the market. This is also similar to the case of Rafii and kampas (2002) who propose a six phase model, allowing for the explanation of various parties to understand the disruptive character of disruptive technologies.

Disruptive Technology

The concept of disruptive technologies comes from Bower and Christensens whose works were published in Harvard Business Review and revealed how the "disruptive technologies" are potentially destructive to already established companies (Bower & Christensen,2015).

According to Bower and Christensens (2015), one of the most consistent patterns in business is failure of leading companies to stay at the top of their industries when technologies or markets change. This has caused other companies which have previously been considered less profitable to exploit ways and