

The sixth wave of innovation: are we ready?

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Abstract

Organizations faced different development paths over the centuries, caused by changes in the competitive environment and the ability to respond to these changes. Such changes and choices can be analyzed from the perspective of innovation waves, responsible for changing the current competition structure and present a new competitive format for organizations. By observing the existing five waves of innovation, we can see a significant jump in development for companies that well understood the context of the new wave and competitive problems for other companies, even leaders in their market were “swept” off the competitive landscape. There are indications that a sixth wave of innovation is coming and who is guided by the sustainability, since the depletion of resources can cause many companies and countries conquer higher competitive performance to seek innovative solutions to the problem and those that fail to do so may have a loss of competitiveness. Given the aforementioned context, this theoretical essay aims to discuss sustainability as the sixth wave of innovation and how it can affect organizations. It is expected that the article raises a reflection about this phenomenon and serve as a starting point for future discussions.

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Introduction

The concept of innovation is directly related to the exploration of successful ideas that can generate profitable products, processes, services or profitable business practices (Schumpeter, 1982; Tether, 2003; Tidd, Bessant, & Pavitt, 2008). For an organization to innovate systematically – in other words, continuously; it should widen its field of vision not only in relation to the market but also in relation to itself (Crossan & Apaydin, 2010; Smith, Busi, Ball, & Van Der Meer, 2008; Tang, 1998). It should also maintain a systematic learning process that allows it to take advantage of new ideas. Companies that do this stand out because they manage to understand the dynamics of innovation in their markets, capturing and responding to changes and signals that arise from the environment (Utterback, 1996).

All products and companies are subject to waves of innovation, in other words, when a product changes significantly as compared to its previous version, leaping significantly ahead, usually driven by technological advances (Utterback, 1996). These discontinuities create the need for companies to seek innovations that enable competitive leaps (Tushman & O’Reilly, 1996) and require organizations to rethink their products and processes, as well as the impact of technology in their field of operation (Utterback, 1996).

Throughout history five main waves of innovation, accompanied by technological and social changes, have been observed (Desha & Hargroves, 2011; Moody & Nogrady, 2010; Seebode, Jeanrenaud, & Bessant, 2012). The first wave of innovation was the Industrial Revolution; the second, the Age of Steam; the third, the Age of Electricity; the fourth, the Age of Mass Production; and the fifth, the rise of Information and Communications Technology and Networks (Moody & Nogrady, 2010). There are signs of a new wave arising – that of Sustainability (Desha & Hargroves, 2011; Moody & Nogrady, 2010; Seebode et al., 2012.).

The current debate revolves around the need for companies to incorporate sustainability as a competitive factor, linking it to

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organizational objectives and going beyond “mere” sustainable discourse in order to generate economic, social and environmental benefits that lead to the creation of competitive advantage and potential innovation (Barbieri, Vasconcelos, Andreassi, & Vasconcelos, 2010; Desha & Hargroves, 2011; Hart, 1997; Hart & Milstein, 2004; Kleindorfer, Singhal, & Wassenhove, 2005; Moody & Nogrady, 2010; Nidumolu, Prahalad, & Rangaswami, 2009; Porter & Linde, 1995; Seebode et al., 2012).

Studies involving innovation and sustainability have attracted increasing attention in recent years, due to problems linked to the depletion of natural resources, pollution, traffic jams, nuclear risk, supply risk, energy and water shortages, sanitation, poverty, and disasters (Markard, Raven, & Truffer, 2012). Such problems provide opportunity for action and highlight the need for sustainable innovation systems, incentive policies and support for sustainability, as well as the development of technologies that enable organizations to combine economic, environmental and social objectives (Markard et al., 2012).

The development of new technology is one of the ways of addressing overcrowding in cities, pollution, traffic jams, an aging population and other social needs, and this can also lead to business opportunities. Thus, innovation has a leading role to play in this process, as it is innovation that enables the development of solutions for such problems (Han et al., 2012).

However, while society is demanding that companies take on an environmental and social role, and while this is seen as an opportunity for companies to develop and innovate, many of the innovation strategies that are adopted are inadequate to accommodate these demands (Hall & Vredenburg, 2012). Throughout history, when a new wave of innovation arises, market positioning changes, so that dominant companies are challenged and sometimes disappear, as they tend to defend their current practices and end up not responding adequately to change (Utterback, 1996).

All these issues make it necessary to discuss the possibility that the fifth wave of innovation is now giving way to Sustainability, since there is a strong social pressure for organizations to make their activities sustainable, as shown by the studies of Barbieri et al. (2010), Desha and Hargroves (2011), Hart (1997), Hart and Milstein (2004), Kleindorfer et al. (2005), Moody & Nogrady, 2010, Nidumolu et al. (2009), Porter and Linde (1995), and Seebode et al. (2012). Thus, this theoretical essay aims to discuss Sustainability as a sixth wave of innovation and how it may affect organizations. In Section “Cycles of change and waves of innovation”, we discuss the cycles of change and waves of innovation that are inherent to the development and survival of organizations; in Section “The sixth wave of innovation”, we analyze the sixth wave of innovation, focusing on signs that point to Sustainability as the next wave of innovation; in Section “Are we prepared?”, we discuss whether organizations are prepared for Sustainability as a new wave of innovation; and finally, we present our conclusions and suggestions for future research.

We hope that this article promotes reflection regarding this phenomenon and serves as a starting point for future discussions about what appears to be a disruption in the *status quo* and a new wave of innovation – that of sustainability.

Cycles of change and waves of innovation

The development and survival of organizations is susceptible to the emergence and recombination of technologies and processes that generate innovative actions, which are responsible for reshaping industry and for the current dynamic (Ansari & Krop, 2012; Utterback, 1996). However, while a disruption in innovation may represent breakthroughs on the technological front, culminating in major advances, these disruptions are difficult to manage and, as a consequence, have historically caused – and continue to cause – major problems for those who deal with them (Tidd et al., 2008).

An analysis of the behavior of market demand shows how, historically, it has been quite variable and how industry has been subject to discontinuities (Freeman, 1979). When a radical innovation is launched, this may drive existing businesses out of the market and allow new companies to emerge, so that market leaders are challenged and may lose their competitive positioning (Ansari & Krop, 2012; Utterback, 1996). This is due to these companies’ rigidity over time, which makes it difficult for them to adapt and respond to change (Tidd et al., 2008).

Evidence indicates that when a company uses a certain technology, or operates in a certain manner, it tends to protect its business format, innovating within the scope of its current activities (Archibugi, Filippetti, & Frenz, 2013; O’Reilly & Tushman, 2004; Seebode et al., 2012; Tushman & O’Reilly, 1996; Utterback, 1996). Companies tend, therefore, to innovate within the context of their previous innovation trajectory, and, as this trajectory is related to learning cycles, they often end up replicating only what they already know, so that it is usually market outsiders that innovate to a greater degree (Archibugi et al., 2013; Seebode et al., 2012). During these periods of discontinuity, new companies join existing companies and the cycles of technological change become challenging for the companies in that market (Ansari & Krop, 2012). This environment is fertile ground for the emergence of innovations from old capabilities, changes in the dominant project, a wave in the ecology of enterprises, new waves of technological change, changes of leadership at the points of inflection of technology and the invasion of technologies coming from outside the industry in question (Utterback, 1996).

These cycles of change can be represented by the model of the dynamics of innovation, according to which each and every industry is reshaped by waves of innovation that represent continuous cycles of technological and social change (Utterback, 1996). These changes give rise to a new dominant design, formed from the balance between what the market wants and what organizations are willing to offer (Utterback, 1996).

This whole process occurs within the context of the industry life cycle and undergoes three phases: the fluid phase, characterized by many product innovations and a low degree of process innovation, during which the dominant design is still unclear and the market is subject to constant change; the transient phase, characterized by a low degree of product innovation and a high degree of process innovation, as it is at this stage that one design becomes dominant and consumer needs become clearer; and the specific phase, during which

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