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The hype cycle model: A review and future directions

Ozgur Dedehayir [a,*], Martin Steinert [b]

[a] Queensland University of Technology, School of Management, Level 9, Z Block, 2 George Street, Brisbane, 4000, QLD, Australia
[b] Norwegian University of Science and Technology, Department of Engineering Design and Materials, Richard Birkelandsvei 2B, NO-7491 Trondheim, Norway

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ABSTRACT

The hype cycle model traces the evolution of technological innovations as they pass through successive stages pronounced by the peak, disappointment, and recovery of expectations. Since its introduction by Gartner nearly two decades ago, the model has received growing interest from practitioners, and more recently from scholars. Given the model's proclaimed capacity to forecast technological development, an important consideration for organizations in formulating marketing strategies, this paper provides a critical review of the hype cycle model by seeking evidence from Gartner's own technology databases for the manifestation of hype cycles. The results of our empirical work show incongruences connected with the reports of Gartner, which motivates us to consider possible future directions, whereby the notion of hype or hyped dynamics (though not necessarily the hype cycle model itself) can be captured in existing life cycle models through the identification of peak, disappointment, and recovery patterns.

1. Introduction

There are many uncertainties associated with technological development. Application realms, customer groups, technical feasibility and performance potentials, and related economic attributes remain hidden from the knowledge of actors that provide input, including innovating firms, governments, research institutions, and finance providers. Stylized depictions such as the diffusion of innovations (e.g. Rogers, 1962), product life cycle (e.g. Klepper, 1996), industry life cycle (e.g. Agarwal et al., 2002), and technology life cycle (e.g. Abernathy and Utterback, 1978) models aim to reduce these uncertainties through the repeated patterns of developmental trajectory they portray. Using these models, multiple actors can make forecasts to assist their resource investment decisions in the absence of complete knowledge of future technological prospects (e.g. Gao et al., 2013). Notwithstanding, forecasting the development of nascent technologies and products, in other words the very early stages of life cycles, remains difficult, given the technical, economic (e.g. supply and market demand), and political barriers that require circumvention, which serve to significantly delay or perhaps even prohibit market penetration (e.g. Kurawarwala and Matsuo, 1998; Ortt et al., 2007; Dismukes et al., 2009; Feng, 2015).

An attractive framework that has recently been introduced to enhance the analysis and forecasting of technologies during the early period of their development is the 'hype cycle model'. Developed by Gartner Inc., this model explains a general path a technology takes over time, in terms of expectations or visibility of the value of the technology. The model proposes that technologies progress through successive stages that are pronounced by a peak, followed by disappointment, and later a recovery of expectations (Fenn and Raskino, 2008). In this manner, the model depicts what has been dubbed the First Law of Technology, stating that "we invariably overestimate the short-term impact of a truly transformational discovery, while underestimating its longer-term effects" (Collins, 2010).

The hype cycle model has gained substantial attention from practitioners, and although its dissemination has been relatively limited in academic circles, there is burgeoning interest within the TIM (technology and innovation management) literature over the past decade as well (evident especially in the Technological Forecasting and Social Change journal). Indeed, the attention afforded by scholars has led to the model's growing maturity as quantitative methods focusing on specificity (e.g. with content analysis) have been combined with qualitative methods to ascertain the emergence of hype in TIM contexts (e.g. Konrad, 2006; Alkemade and Suurs, 2012; Jun, 2012a). Given these recent trends and the importance of forecasting the trajectories and life cycles of new technologies from an organizational standpoint, to which end the hype cycle model has been proposed, the objective of this paper is to review the operationalizability of the model through empirical examination. For this purpose, we seek evidence directly from Gartner that technologies progress through the sequential stages of the hype cycle model, thus providing confidence of the model's repeatability, a characteristic of already established life cycle models. Using a two-step approach, we firstly undertake a longitudinal study of 46 technologies analyzed by Gartner in one of their report series — "technologies for utilities and the energy sector". We secondly examine the hype cycle conforming behavior of three technologies from this collective – tidal power, IGCC (Integrated Gasification Combined Cycle), and

* Corresponding author.
E-mail addresses: ozgur.dedehayir@qut.edu.au (O. Dedehayir), martin.steinert@ntnu.no (M. Steinert).

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photovoltaic generation – by comparing Gartner's reported progression of these technologies along the hype cycle curve with real empirical data obtained from Google News and Google Insight.

The results of our empirical work show incongruences connected with the reports of Gartner, thus questioning the reliable applicability of the hype cycle model. Notwithstanding, the notion of hype or hyped dynamics, though not necessarily the hype cycle model itself, presents an important addition to existing life cycle models in the TIM research field, which are important tools for understanding and forecasting the adoption of technological innovations by consumers. In this regard, to attain a comprehensive understanding of the over-enthusiasm that may (or may not) eventuate in relation to a new technological innovation we believe that Rogers (1962) diffusion of innovations framework presents a fruitful starting point. From the elements that constitute this framework, and in alignment with Jun's (2012a) recent work, we propose that hypes in TIM contexts should be sought with respect to the media, social system, and the innovation itself, which experience change over time. We additionally suggest that an understanding of hype dynamics in the industry, product, and technology life cycles (e.g. Phillips, 2001; Ortt and Schoormans, 2004; Routley et al., 2013) can provide valuable information for organizations while extending the existing, stylized theoretical models.

2. The hype cycle model

Introduced in 1995 by Gartner Inc. the hype cycle model explains a generally applicable path a technology takes in terms of expectations or visibility of the value of the technology (y-axis) in relation to time (x-axis). It is formed by merging two distinct equations/curves that, after Hubert Delay from Gartner, explains the hype curve shape for new technologies, as shown in Fig. 1. The first equation is human centric and describes expectations in the form of a hype level curve. The second equation is a classical technology S-curve aiming to depict technology maturity (Fenn and Raskino, 2008).

The bell shaped curve of expectations/hype is firstly based on a sudden, overly positive and irrational reaction on the introduction of a new technology. Fenn and Raskino (2008) argue that three human nature phenomena are responsible for the curve's shape: attraction to novelty (and the love for sharing), social contagion, and heuristic attitude in decision-making. Together, these phenomena lead people to assess a new technology's potential with overenthusiasm. The media additionally tend to focus on potentially big stories and the resulting collective hypes the number of supporters over a critical mass. Once a technology begins to hype, decision makers in organizations may follow the trend rather than carefully assessing the technology's potential themselves. This is potentially a dangerous tactic as the sharp peak of enthusiasm of the new technology is often followed by disappointing early results of the first generation of applications, causing the hype to suddenly ebb and collapse into a trough.

The second equation that forms the hype cycle is the S-curve, which describes technological maturity based on the notion of technical performance. Technology S-curves can be traced back to the findings of Dosi (1982) who distinguished between continuous or incremental changes, where technologies follow a trajectory defined by established technological paradigms, and discontinuous or radical changes sponsored by the emergence of new technological paradigms. By comparing the changes in a single technological performance parameter with respect to exerted R&D efforts, Foster (1986), in turn, has suggested that these trajectories are S-curve shaped. He showed that the maturity of a technology develops slowly in the beginning as its fundamentals are poorly understood and investments into pilots and early adoptions may result only in minor performance gains. Notwithstanding, at some turning point technological performance takes off until a plateau is reached, defined by the limitations of the technology with an upper limit due to physical barriers or cost-prohibitions.[1]

As indicated in Fig. 2, the hype cycle can be divided into five distinct phases: innovation trigger, peak of inflated expectations, trough of disillusionment, slope of enlightenment, and plateau of productivity (Fenn and Raskino, 2008). Each phase is marked by indicators that allow the assessment of the stage of development of a given technology.

Innovation trigger: A public announcement or demonstration triggers the cycle. Awareness about the technology starts to spread and attracts first media coverage. Venture capitalists and adopting companies aim to capitalize on possible first mover advantages.

Peak of inflated expectations: This phase is characterized by high expectations boosted or hyped further by media coverage. Following a bandwagon effect, companies invest without having a clear strategy or sound business case.

Trough of disillusionment: The overenthusiasm and hyped investments result in commercial adoptions that fail to meet performance and/or revenue expectations. Public disappointments spread and are again hyped by media, this time negatively.

Slope of enlightenment: Some early adopters who continued working with the technology begin to experience net benefits and regain motivation. With more investments, the contextual understanding of the technology grows, resulting in increasing performance. The technology begins to be socialized.

Plateau of productivity: The technology is realistically valued. Following successful market place demonstrations, the adoption accelerates.

The time between the peak of inflated expectations and the plateau of productivity has been termed the 'time-to-value gap' (Fenn and Raskino, 2008). This gap may differ depending on each technology's performance constraints, integration complexity, and penetration potential. As a result, the hype cycle pertaining to different products may vary between two years and two decades, although so-called 'normal technologies' are anticipated to take five to eight years, in contrast to 'fast track technologies' which are deemed to need only two to four years to reach maturity. On the contrary, 'long fuse technologies' may go through several hypes and troughs.

2.1. The hype cycle model in the literature

To understand the utilization of the model by the scholarly community, we explored the TIM (technology and innovation management) literature. Our review was designed to reveal the number of publications as well as the predominant outlets (i.e. journals and conference proceedings) citing the concept, and at the same time provide an overview of the theoretical contributions and empirical findings provided by scholars.

We undertook a systematic approach to study the TIM literature. First, we accessed the ISI Web of Science database and conducted a search for the exact phrase "hype cycle" in the title, abstract, and keywords of published journal and conference papers.[2] The results of the bibliometric study show that a total of 30 works have been published since the year 2000. And while there is notable growth in the number of publications from the year 2007 onwards,[3] our results indicate the nascence of this theoretical framework in the academic context. We then read through the abstracts of the 30 publications and established a list of six publications that had explicitly discussed or employed the hype cycle model in the TIM research context.

[1] It must be stressed that the discussion on generalizing technology S-curves is far from concluded with opposing literature. Equally disputed is the ability of S-curves to serve as forecasting tools (Christensen, 1992).

[2] This search was conducted on 10 July, 2013.

[3] According to the 'citation report' of the ISI Web of Science, these publications have collectively obtained a total of 70 citations, with an average of 14 citations per year.

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