



Contents lists available at ScienceDirect

## Industrial Marketing Management



## Infighting and fitting in: Following innovation in the stent actor–network

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## ARTICLE INFO

## Article history:

Received 12 December 2012

Received in revised form 28 February 2014

Accepted 28 February 2014

Available online xxx

## Keywords:

Marketization

Actor–network theory

Longitudinal case study

Innovation

Creative destruction

## ABSTRACT

This paper examines the technological and market innovation processes associated with emerging markets. Through a longitudinal study of the stent actor–network, four contests that punctuated the stent market's emergence are identified. *Corporeal battles* occurred as stents were fitted into the human body, and as the market emerged and stabilised through a process of *creative construction*. Subsequently, *corporate wars* developed between emergent corporate actors, and, in parallel, an *incorporation campaign* occurred in which emergent corporate actors sought to fit in to the established actor–network. Finally, *civilized confrontation*, or the 'normal' activities expected in a stabilised market, emerged. We conclude that, prior to Schumpeter's *creative destruction* impacting on the established market, there is a period of *creative construction*. We introduce the term 'mutable marketing' to describe the dominant market innovation processes evident during this period. This research shows that emergent actors are likely to be destroyed through mutually antagonistic infighting.

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## 1. Introduction

This paper reports on a study of technological and market innovation in the particular setting where a new market comes to be. Following Çalişkan and Callon (2010), we use the term marketization to describe these technological and market innovation processes associated with the establishment of markets. Actor–network theory provides the dominant theoretical frame in this study, because it is especially suited to the study of processes, or the question of how things (markets, objects, ideas, etc.) come to exist or be seen as real. It was also chosen because of its scepticism about accepted categories and its willingness to consider the role of a wide range of actants, often overlooked in social theory. The study's empirical setting is what is now known as the 'stent market',<sup>2</sup> and, in effect, our research describes and analyses the innovations and contestations that have brought us to the point where concepts such as the 'stent market' have come to be (to use some actor–network language) 'punctualised' or 'blackboxed' (i.e., broadly understood and taken for granted).

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<sup>1</sup> Tel.: +353 1 7164751.<sup>2</sup> To be clear, we understand that the entity we describe here as the 'stent market' can only be perceived as a market in retrospect. This description, and subsequent references to a 'CABG market' should be read in this context, i.e. in the understanding that they come to be seen as markets in retrospect.

In the literature, the dominant view of this process draws on the work of Schumpeter (1942/1976), who introduced the term 'creative destruction' to describe the phenomenon. Schumpeter used dramatic examples to illustrate the process of creative destruction, such as the eventual overwhelming of the water-wheel by the modern power plant, and the charcoal furnace by the steel mill. This 'creative destruction' concept – the 'process of industrial mutation ... that incessantly revolutionises the economic structure from within, incessantly destroying the old one, incessantly creating the new one' (Schumpeter, 1942/1976, p. 83) – is broadly accepted within the literature. For example, several of the terms Ehrnberg (1995) and Dahlin and Behrens (2005) review in relation to technology, such as 'revolutionary', 'invading', 'radical', or 'competence-destroying' closely reflect the sense of this term. Walsh, Kirchhoff, and Newbert (2002) consider the timing of 'a truly market destroying innovation' (p. 347), while the concept of a 'disruptive technology' (Christensen, 1997; Christensen & Raynor, 2003) is closely aligned with the concept of creative destruction. The concept is so widely accepted that it can be reasonably described as *foundational* in the literature, and as such it warrants examination. In this case, we examine it through a marketing lens, and specifically a market-making lens, and critically reconsider its meaning and applicability in terms of the issues that emerge.

Our paper is structured as follows. The next section situates our study within the literature on market innovation and marketization, and outlines our research methodology. Our analysis of the empirical material led us to identify four contests through which market innovations are performed, and the following four sections describe and discuss each of these. We then review the market and technological innovation evident within this case study and contrast it with Schumpeter's model of creative destruction.

## 2. Situating the study

Before discussing the nature of market innovation, it makes some sense to articulate our understanding of what constitutes a market. For us, markets are more than dyadic exchange relationships between producers and consumers. Rather, they are, in Araujo, Finch, and Kjellberg's (2010, p. 5) phrase, 'plastic phenomena that emerge from organizing', and are constituted by 'market spaces' within which 'products [are] the objects of collaborations, contests, and interactions' (Finch & Geiger, 2011, p. 899). This focus on collaborations and contests fits well with an actor–network approach, which has consistently taken an agonistic perspective on the construction of things and ideas. Markets are *made*; they are outcomes of processes that are – at least from an actor–network perspective – agonistic. This perspective is also aligned with a distinctive research stream in marketing that sees markets as constructed, situated phenomena that emerge through practices involving actors with different experiences and attributes, material devices, and theoretical ideas about the nature of markets and marketing (Araujo, Kjellberg, & Spencer, 2008; Azimont & Araujo, 2007; Callon, Millo, & Muniesa, 2007; Fligstein, 1996; Harrison & Kjellberg, 2010; Howells, 1997; Rosa, Porac, Runser-Spanjol, & Saxon, 1999; Theoharakis & Wong, 2002).

Markets are also *performed*. Performativity describes the phenomenon wherein a model of the world works to make real the world that it represents. Performative statements about the world only make sense within a self-referring system of practices and beliefs that are mutually validating and sustaining (Barnes, 1988; Luhmann, 1995). For example, money is performative in so far as the exchange of marked pieces of paper for products and services works to reinforce the belief that such pieces of paper represent money and value, while at the same time these beliefs enable and sustain the exchange practices. More generally, models of the world – including representations of markets – are best understood as engines, actively transforming, altering and constituting the world of which they form an important part, rather than as cameras, passively recording the environment (Callon, 1998, MacKenzie, 2006).

We studied the marketization processes out of which emerged what is now recognisable as the market for stents. Stents are small tubes, usually metallic, that are inserted in the body using flexible catheters, with balloons often used to expand them in the clogged arteries they are designed to clear. Coronary stents, which frequently obviate the need for open-heart surgery, were first tested in humans in 1986, commercially launched in the US in 1994, and were followed by drug-eluting stents (DES) – launched in 2003 in the US. The development of the technical device (i.e. catheter, balloon and bare-metal/drug-eluting stent) is important within this case and a very brief timeline of its marketization is provided in Fig. 1.

Marketization processes are probably best inquired through in-depth, empirical, longitudinal case studies, where data is collected over an extended time period, based on the assumption that such processes are unlikely to be apparent over short time horizons. This is the approach adopted in this study. As such it shares a limitation with all historical studies, which are necessarily selective in retrospectively seeing some things and not seeing others. Our method was influenced by Latour, Callon, Law and other actor–network contributors who advocate the detailed study of actions, over time, through which actors become

powerful, and things – including markets – come to be (Callon, 1998; Callon et al., 2007; Latour, 1991).

Defining the point at which the marketization processes became specific to what came to be known as the stent market presented a particular challenge. There is a long history of inserting objects into the human body, but the bulk of our empirical material relates to activities that happened during the second half of the twentieth century. We illustrate how an object – the stent – began to impact an existing market – the coronary artery bypass graft (CABG, or open-heart surgery) market – as this period progressed. In this respect, the case is a story about an existing market being threatened by the emergence of another, a phenomenon that is most commonly explained through appeal to Schumpeter's (1942/1976) concept of 'creative destruction', and Christensen's notion of 'disruptive innovation' (e.g. Bower & Christensen, 1995; Christensen, 1997; Christensen & Raynor, 2003).

Our actor–network approach meant that, rather than centring on one or other domain, we collected data on the product, the firms, the industrial context, the regulatory environment, related technologies and legal activity. Consequently, a large amount of data relating to marketization processes over time was collected and analyzed. Our main data sources included the firms themselves, regulatory bodies, industry association publications, academic journals, and market reports. For example, we accessed several years of financial data for each of the firms listed, as well as product information, previous case studies and newspaper articles. We utilised several commercial, governmental, regulatory and academic sources to construct a comprehensive record of events. These included the FDA, the National Hospital Discharge Surveys in the US, industry reviews, medical device industry representative associations, and product-based and clinical sources.

In addition, we conducted eight semi-structured interviews with senior practitioners – both managerial and technical – in the stent industry, and two technical experts not directly employed in the industry. These interviews occurred during a period of substantial turmoil in the industry, as the launch of the second-generation products was imminent. As a result, gaining access to the firms was challenging, and interviewees' demeanours were frequently reserved. Regardless, the interviews were useful in that they confirmed that the issues of importance elicited from the practitioners were broadly similar to those extracted from secondary sources. They also facilitated an exploration of the details of these issues, and contributed to a more refined understanding of the case.

The study followed an inductive approach (Locke, 2007) in that it induced theoretical concepts and relationships through repeated analysis and synthesis of the empirical data. Through this analysis, we identified four primary contests that frame the marketization narrative. The first contest – which we term *corporeal battles* – describes how advocates of the stent technology attempted to prove that the technology is a viable treatment for specific illnesses of the human body. After stability had been achieved – in terms of illustrating the viability of inserting stents into human bodies – a quite different set of battles began, one of which involved newly emergent corporations engaging in intense, internecine competition with one another. We term this set of struggles, *corporate wars*. At the same time, these emergent competitors adopted a radically different approach in their interactions with established actors (e.g. coronary surgeons, hospitals, regulatory authorities). If the

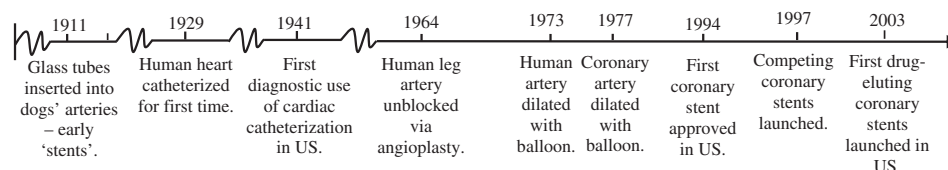


Fig. 1. Marketization of the stent technical device.

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