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Stretching, embeddedness, and scripts in a sociotechnical transition: Explaining the failure of electric mobility at Better Place (2007–2013)

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ABSTRACT

Based on field research, interviews, and participant observation, this study explores the failure of Better Place—a now bankrupt company—to successfully demonstrate and deploy battery swapping stations and electric vehicle charging infrastructure. To do so, it draws from concepts in innovation studies, sociotechnical transitions, management science, organizational studies, and sociology. The study expands upon the notion of “fit-stretch”, which explains how innovations can move from an initial “fit” (with existing user practices, discourses, technical form) to a subsequent “stretch” (as the technology further develops, new functionalities are opened up, etc.) in the process of long-term transitions. It also draws from the “dialectical issue life cycle model” or “triple embeddedness framework” to explain the process whereby incumbent industry actors can introduce defensive innovations to “contain” a new niche from expanding. It lastly incorporates elements from design-driven innovation and organizational learning related to schemas and scripts, concepts that illustrate the vision-dependent and discursive elements of the innovation process. It uses the case study of Better Place to test and build upon these concepts. With a market valuation of more than \$2 billion, Better Place was poised to become one of the most innovative companies in the electric mobility market. Yet after operating for five years it declared bankruptcy and saw its assets sold off for less than \$500,000. We suggest here that Better Place failed because it “stretched” to the point that it “broke;” that it provoked a defensive response from both old automotive manufacturers (such as General Motors) and new ones (such as Tesla); and that the fantastic nature of its visionary scripts convinced its investors and promoters to unrealistically raise expectations and downplay persistent risks.

1. Introduction

Project Better Place, later renamed “Better Place,” was a venture-capital backed international company that developed battery charging and switching infrastructures for electric vehicles and sold electric mobility services to drivers. While founded in 2007 and headquartered in California, it operated primarily in Denmark and Israel, where it saw the opening of its first charging station in 2008 (Noel and Sovacool, 2016). At the height of its success, it was considering expansions to a half-dozen other countries and had a market valuation that peaked at approximately \$2.25 billion (Orsato et al., 2009) undergirded with investments from General Electric, Hong Kong Shanghai Bank of China (HSBC), and Morgan Stanley, in addition to endorsements from prominent public figures. It also saw the launching of its first prototype vehicle (manufactured jointly with Renault) on the market in 2012. A mere year later, in May 2013, the company filed for bankruptcy and

saw its assets seized and sold off for \$450,000—the price of a single apartment in Tel Aviv (Kloosterman, 2013).

Why did Better Place fail after securing funding, attracting partners, and operating in two “green” countries with a novel idea? For business experts, the reasons stipulated are straightforward. They contend that Better Place’s financial difficulties were caused by technological inferiority—electric vehicles with limited range and battery designs not yet ready for extensive commercial deployment. Such technical difficulties were only exacerbated by mismanagement on behalf of its entrepreneurial but somewhat erratic founder Shai Agassi; wasteful efforts to introduce pilot projects in too many countries; and large amounts of investment sunk into charging and battery swapping infrastructure (see Woody, 2013; Kershne, 2013; Elis, 2013; Naor et al., 2015; Noel and Sovacool, 2016). On the other hand, some academics have praised Better Place for its presumed innovativeness and likely future success (e.g. Christensen et al., 2012; Kley et al., 2011; Andersen et al., 2009).

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Overall, we maintain that neither practice-oriented or academic explanations offer a sufficient or complete answer.

To make this case, in this paper we use insights from innovation and management theory related to sociotechnical transitions, embeddedness, and schemas and scripts. By doing so, we not only provide a grounded account of an event that is too common in the car industry, but one that also provide insights for those seeking to change the technological regime of the automotive industry. Drawing from extensive original data collection derived from field research, we contend that Better Place failed because it attempted to “stretch” too quickly from its initial “fit” with existing user practices and conventions surrounding user mobility. We also argue that rather than existing in a vacuum, Better Place promoted a strategic response from competing industry stakeholders. Some of these incumbents, such as General Motors, responded by promoting their own battery electric vehicles and swapping stations in tandem with others, such as Tesla, which explored their own type of swappable batteries. Lastly, we maintain that Better Place subscribed to a vision-dependent corporate mission and strategy that ended up relying on unrealistic discursive scripts that overestimated benefits and underestimated costs.

In proceeding along these lines, the study sets out to make three contributions. First, examining the sociotechnical challenges facing Better Place brings to light pressing policy and economic questions about the viability of emerging business models for electric mobility. For all intents and purposes, Better Place *should* have worked or at least *could* have worked. It was backed by strong investors and solicited significant consumer and policy interest. The fact that it failed, somewhat spectacularly, serves as a stark warning for those seeking to promote more socially acceptable, politically attainable, economically justifiable markets for low-carbon transport modalities. Second, Better Place provoked a response from incumbents, and therefore better comprehending its struggles generate insights into patterns of obduracy, incumbency, and socio-technical lock-in that can stymie the adoption of socially beneficial niche innovations. Third, by synthesizing from three separate conceptual domains, the paper underscores the necessity of taking a ‘theoretically eclectic’ approach to the study of sociotechnical change (Sovacool and Hess, *in press*), in this instance the significance of techno-economic factors (such as automobiles, batteries, and tariffs as well as industrial strategy) alongside socio-political-cognitive factors (such as user perceptions of radicalism vs. incrementalism, cultural embeddedness, and rhetorical visions).

2. Research methods and concepts

Our data for this study was original qualitative research drawn from a mix of research interviews and longitudinal participant observation. Our primary data tool was semi-structured interviews. This means our data collection involved the asking of semi-structured questions to respondents, sometimes referred to as “guided introspection,” “intensive interviewing” or “responsive interviewing” (Hancké, 2009). This technique asks participants a set of standard inquiries but then allows the conversation to build and deviate to explore new areas. Such interviews are most appropriate when the goal of research is to understand the meaning that individuals give to their actions, particularly when the research objective is to comprehend complicated programs or events and how they intersect with perceptions, beliefs, and values (Drumwright and Murphy, 2004; Yin, 2003). We decided on an elite sampling strategy, meaning we targeted participants with control over the case in question, as opposed to laypersons, consumers, or voters (Lincoln and Guba, 1985; Dexter, 1970). Elite interviews are most useful when intended to reveal the motivations and actions behind decision-making, as it can depict how respondents perceive reality from the viewpoint of someone on the “inside.”

Forty-three interviews were completed with Better Place (BP) employees as well as competing automotive companies, some suppliers and some manufacturers over the course of 2008 to 2016. Context

interviews were carried out initially; these included interviews with elites/experts in the automotive industry. Collection of company-level data at BP took place in stages. Pilot interviews at Better Place took place in 2008 and 2009 (including one with the founder and promoter, Shai Agassi) followed by interviews with top managers and technicians of BP in 2009 and 2010 across several parts of the world (Denmark, Israel, Japan, and the United States). These were followed by a final set of interviews in 2015 and 2016 with automotive experts and former staff at BP.

A few other specifics of this research process deserve mentioning. Interviews lasted between 40 and 90 min; some of the context interviews lasted up to 2 h. The interviews were transcribed and a complete database was created. Given that the problem of access is a typical characteristic of empirical research in the industry (Bulmer, 1988), the authors utilized a “snowball strategy” to contact development (Robson, 1993). One of the authors first interviewed the experts familiar to them or colleagues before having them suggest others to meet, branching out to other companies and organizations. The chosen interviewing strategy thus had a strong focus on information provided by the respondent combined with a weak emphasis on the process of interviewing. In other words, “what” was more important for the applied interviewing strategy than “how” or “who.” This differs from “creative” or “active” interviewing, which is based on the idea that the process of interviewing is at least as important as the information provided by the respondent (Holstein and Gubrium, 2002). While active interviewing is indispensable for studying topics that touch upon the deep personal experiences of respondents, it was not applicable in the present study on BP management and work-related functions. Interviews were supplemented with company documents, direct observation, and site visits shown in Table 1. In the sections of the paper to come, we inductively and qualitatively build the storyline from both a mix of the interviews and literature, in order to enhance its coherence and narrative flow.

The data from these interviews is presented as anonymous—as coming from a “participant” or “interviewee” without full attribution—for multiple reasons. First, we are unable to offer more details or profiles of respondents because of confidentiality concerns. Confidentiality was mutually agreed upon at the beginning of each interview to adhere to the ethics guidelines at the authors’ institutions. Second, anonymity protects respondents from retaliation over divulging potentially controversial information, especially when the topic is as polemic as a company that went bankrupt. Moreover, anonymity encourages candor, as people often speak their minds if they no longer have to worry about their statements coming back to haunt them. Lastly, individuals were not speaking on behalf of their institutions and were instead giving their personal opinion, making institutional affiliation less relevant (though still important for sampling purposes).

To ensure triangulation, we supplemented our original data with a review of the peer-reviewed literature on both electric mobility generally and more specifically the contours and operations of Better Place. We searched key academic databases such as Scopus, ScienceDirect, and EBSCO-Host for articles published in the last ten years (2006–2015) looking at (a) the social acceptance of electric vehicles, (b) business models for electric mobility, and (c) case studies of Better Place (of which there were only a handful). We compiled dozens of studies though we reference only the most relevant ones here.

To filter this capacious amount of data, we rely on three distinct concepts: “fit-stretch,” the “triple embeddedness framework,” and the notion of “schemas and scripts.” To be sure, these three conceptual approaches are among many that could have been utilized; Sovacool (2017) interviewed social theorists about which theories best “fit” the topic of electric mobility transitions and generated a list of 54 relevant to the topic. Sovacool and Hess (2017) similarly interviewed theorists about conceptual frameworks seeking to explain sociotechnical change and generated a list of 96 theories. We selected these three in particular because we wanted one to address patterns of transition (“fit-stretch”); one on incumbency (“triple embeddedness”); and one on discourse and

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