

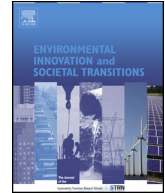


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On the relation between communication and innovation activities: A comparison of hybrid electric and fuel cell vehicles

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ABSTRACT

The automotive industry has proposed and announced a number of technological innovations to reduce the environmental impact of transport. Whereas initially many of the proposed technologies were surrounded by very optimistic expectations, many technological innovations are not commercially available yet and expectations eventually turned into disappointment. The hypes concerning these alternative drivetrain technologies collapsed when optimistic announcements could not be met, within the proposed timeframe. This paper analyzes the relation between research and development activities (innovation activities) and communication activities in the automotive industry using patent statistics, press releases and interviews. The analysis reveals that the underlying characteristics of the specific technology have an influence on the relation between communication and innovation activities. When innovations depend on the build-up of a new infrastructure actors have a strong incentive to raise expectations. This suggests that the specific shape of the hype cycle is depending on the complexity of the technology.

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1. Introduction

The transport sector is one of the most polluting sectors and several technologies have been proposed in the last decades to improve the energy efficiency and reduce the emissions generated by

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the sector (Geels, 2012; Sperling and Gordon, 2009). At different times during previous decades different technologies such as battery electric vehicles, fuel cells or bio-fuels, were considered the most promising candidate to reduce the environmental impact of the automotive-based transport system. However, many of these technologies could not fulfill their initial promises and positive expectations turned into disappointment. More specifically, we observed several hype disappointment cycles with regard to these green propulsion technologies (Bakker, 2010; Geels, 2012). The observed hypes eventually collapsed when the initially very positive expectations could not be met, and turned into disappointment (Linden and Fenn, 2003; van Lente, 1993; van Lente et al., 2013). These hype cycle dynamics are not just an artifact of the discourse around a technology, they also influence and are influenced by the actual innovation activities. Previous studies have shown, for example, that discourse activities are pivotal to expectation building processes and thus to policy and investment decisions (Borup et al., 2006; Konrad, 2006b). But whereas the uptake of the hype cycle can trigger innovation activities, the subsequent downturn may lead actors to eventually withdraw from their activities in the field (Bakker and Budde, 2012; Ruef and Markard, 2010b). In a worst case scenario the negative dynamics may even stop the further development of a technology. Thus the analysis of the patterns and causes of such expectation dynamics and insights in the role and nature of communication activities and their relation to innovation activities are important for actors involved in the development of a technology.

The main topic of this paper is therefore the extent to which the *announcements*, i.e., the communication activities of sustainability innovations by the automotive industry (“*talking*”), are matched by a corresponding level of activities for development and deployment (“*doing*”). The analysis of the relation between these two kinds of activities is in particular relevant since a gap between the promises made in the communication and the innovation activities may eventually lead to the emergence of a hype-disappointment cycle. In this paper we will therefore make an analytical distinction between activities focusing on the “*doing*”, referring to them as innovation activities, and the “*talking*”. The latter we refer to as communication activities. Following this analytical distinction we scrutinize the relation between the communication activities and the innovation activities in the automotive industry. We chose to analyze two clean vehicle technologies that differ with respect to market penetration: hybrid electric vehicles and fuel cell vehicles. While hybrid vehicles are widely diffused to the market, fuel cell vehicles are still not for sale to the general public. More specifically, this paper analyses the communication and innovation activities of the two leading car manufacturers of these technologies, Toyota (HEV) and Daimler (FCV).

Therefore we raise the following research questions:

RQ: What is the relation between innovation and communication activities in the automotive industry and are there differences observable with regard to HEV and FCV and – if there are differences, how can these differences be explained?

The remainder of the paper is structured as follows: Section 2 discusses the conceptual framework, which is based on the literature on the sociology of expectations, (organizational) legitimacy and transition studies. In Section 3 we focus on the methods and the empirical data used for this paper, including descriptions and definitions of the two drivetrain technologies. Section 4 will present the empirical data, followed by conclusions in Section 5.

2. Theoretical background: expectations, discourses, legitimacy

This paper builds primarily on the literature on expectations which emphasizes the important role of communication activities for the motivation, guidance and coordination of innovation activities. First, we discuss the role of (collective) expectations shaped in discourses as described in literature on the sociology of expectations. Second, we will discuss the role of legitimacy and environmental pressures for the emergence and persistence of organizations and the role communication activities may play in these processes.

Innovation is a risky, long-term process in which many technologies eventually fail. This holds particularly true once a technological paradigm (Dosi, 1982) or dominant design has emerged (Tushman

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