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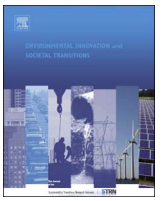

Sequence and alignment of external pressures in industry destabilisation: Understanding the downfall of incumbent utilities in the German energy transition (1998–2015)

Gregor Kungl[a,*], Frank W. Geels[b]

[a] University of Stuttgart, Institute for Social Sciences, Department of Organizational Sociology and Innovation Studies, Seidenstraße 36, 70174 Stuttgart, Germany

[b] University of Manchester, Manchester Institute of Innovation Research, Oxford Road, Manchester M13 9PL, UK

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ABSTRACT

This article makes two contributions to the emerging research stream on regime and industry destabilisation in the transition literature. First, we replicate the multi-dimensional framework developed by Turnheim and Geels with a more contemporary study that has closer links to sustainability transitions. Drawing on a wide range of primary and secondary sources, we analyse the destabilisation of the German electricity industry, which faced multiple external pressures: renewable energy technologies, nuclear phase-out policy, the financial-economic crisis, and negative public debates. Second, we elaborate the role of multiple pressures in industry destabilisation, focusing in particular on their sequence and alignment. We inductively identify patterns such as the 'masking effect' of highly visible macro-shocks, 'perfect storm' pattern, a 'killer blow' effect, and spillover dynamics between external environments.

1. Introduction

While many studies in the sustainability transitions literature focus on emerging 'green' innovations, an emerging research stream is also addressing the flip-side of transitions, namely the destabilisation of existing regimes and industries (Karltorp and Sandén, 2012; Turnheim and Geels, 2012; Stegmaier et al., 2014; Kivimaa and Kern, 2016). This paper aims to contribute to that literature, focusing on industry destabilization, which we conceptualize as the *unlocking* of core regime elements such as routines, technical capabilities, strategic orientation and mind-sets (Nelson and Winter, 1982; Turnheim and Geels, 2013).[1] Many existing literatures offer relevant (yet partial) insights with regard to industry destabilisation, although we will argue that destabilisation *in the context of sustainability transitions* requires a broader, inter-disciplinary approach.

- Industrial economists and economic historians (Lazonick, 1983; Lorenz, 1994) emphasise economic pressures on industries (cheaper foreign competitors, shrinking markets shifting user preferences) and slow firm-level responses because of organisational inertia and routines.
- Evolutionary economists and technology management scholars (Nelson and Winter, 1982; Tushman and Anderson, 1986; Rosenbloom and Christensen, 1994) see destabilisation as driven by disruptive technologies, which cause the downfall of incumbent firms, which respond too slowly because they are locked-in by routines, technical capabilities, and strategic commitments.

* Corresponding author.
E-mail addresses: gregor.kungl@sowi.uni-stuttgart.de (G. Kungl), frank.geels@manchester.ac.uk (F.W. Geels).

[1] Industry destabilisation is thus *not* the same as industry decline, although the latter may contribute to the former.

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- Sociological and neo-institutional literatures emphasise socio-political pressures from activists and social movements (Hiatt et al., 2009), policymakers (Scott, 1995), or public debates and discourses (Maguire and Hardy, 2009), which de-legitimate and de-institutionalise institutional logics, including mission and mind-sets.
- The organisational decline literature highlights *endogenous responses* and unsuccessful adaptation to external pressures. This literature understands decline as a longitudinal process, consisting of several stages (Hambrick and D'Aveni 1988; Weitzel and Jonsson, 1989; Collins, 2009). It suggests that firms struggle to adjust to external pressures in a timely manner because of initial denial or mis-interpretation (Ocasio, 1997; Gopinath, 2005), because of mis-match between information and existing mind-sets or because of complacency. When problems are subsequently recognised, reorganisation and radical innovation are risky, costly (especially in capital intensive industries), and uproot existing capabilities, procedures and routines, which often causes organisational resistance (Tushman and Anderson, 1986; Leonard-Barton, 1992; Lorenz, 1994). Organisations therefore often postpone adaptation of core organisational elements for too long, relying instead on defensive strategies such as downsizing, cost-cutting, efficiency improvements (Barker and Mone, 1994). It therefore often takes an external shock or crisis to overcome inertia and change organisational core elements (Taylor, 1982). This reorientation may be 'too little, too late, leading to exit.

While most of these disciplinary literatures usefully highlight the interplay between external environmental pressures and endogenous firm-level responses, they have two related shortcomings. First, their focus on a few dimensions has limitations in the context of sustainability transitions, which are multi-dimensional, co-evolutionary processes (Geels, 2005; Van den Bergh et al., 2011). Second, many studies (especially the phase-models in the organisational decline literature), conceptualise the topic as firms-in-industries facing *one* external pressure. The wider organisational literature also seems to focus on single environmental jolts or shock (Meyer et al., 1990; Sine and David, 2003; Suarez and Oliva, 2005).

Because of these limitations, we build on a conceptual framework developed by Turnheim and Geels (2013) which understands destabilisation as a multi-dimensional process including the interplay of various external pressures and endogenous responses (see Section 2). We aim to make two contributions with regard to this framework. First, we want to replicate it with a more contemporary study (the destabilisation process of the German electricity industry) that is more closely related to sustainability transition. Second, we want to elaborate the framework by studying the role of *multiple* external pressures in industry destabilisation. In particular, we aim to investigate the *sequence* of pressures and their *alignment* with the aim of identifying patterns.

The research setting is the German electricity industry, which experienced major changes in fortune in the last decade. After liberalisation in 1998, the industry consolidated, resulting in the Big-4 (E.ON, RWE, EnBW, Vattenfall), increased its percentage of electricity generation (from 71% in 1998 to 90% in 2004), and saw major share prices increase between 100 and 200% between 2001 and 2008. Subsequently, however, net profits nosedived (Fig. 1), share prices collapsed (Fig. 2), and the Big-4 percentage of electricity generation decreased to 73% in 2014 (Bundesnetzagentur and Bundeskartellamt 2015). These problems destabilised the existing industry regime, undermining mind-sets, business models and technical competencies. The CEO of EnBW, for instance, stated in the 2012 annual report: "I see a paradigm shift in the energy sector that questions the traditional business model of many power supply companies".

The destabilisation process was related to the electricity transition, which saw the market share of renewable electricity technologies (RETs) increase to 30,1% in 2015 (Fig. 3). But it was also related to other external pressures such as the financial-economic crisis in 2008/9, public protests and negative discourses, the 2011 Fukushima nuclear accident and the German government's decision to phase out nuclear power by 2022. The case thus seems suitable to investigate sequence and alignment between *multiple*

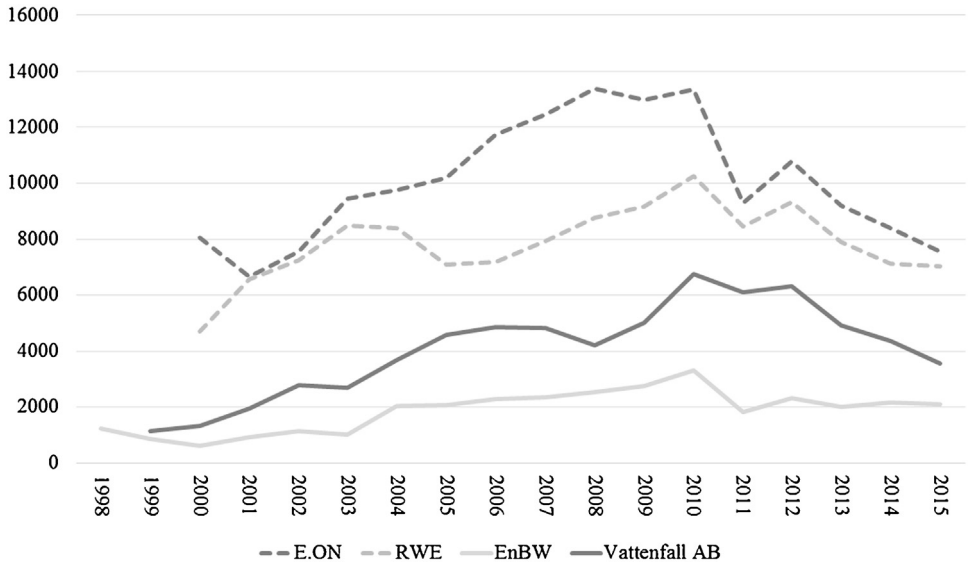

Fig. 1. Development of the Earnings Before Interest, Taxes, Depreciation and Amortisation (EBITDA) of the Big-4 utilities, in million euros. (Source: Annual reports).