



Persistence of innovation: Discriminating between types of innovation and sources in revised state dependence

Alois Ganter, Achim Hecker*

University Seeburg Castle, Seekirchen am Wallersee, Salzburg, Austria

ARTICLE INFO

Article history:

Received 25 August 2011
Received in revised form 4 February 2013
Accepted 16 April 2013
Available online 18 July 2013

Keywords:

Organizational innovation
Persistence
Process innovation
Product innovation
State dependence
Technological innovation

ABSTRACT

This paper advances current research on the persistence of innovation drawing on a panel data set constructed from three waves of the German part of the Community Innovation Survey covering the time span from 2002 to 2008 (i.e., CIS IV, CIS 2007, and CIS 2009). We explore persistence patterns for various types of innovation (i.e., organizational, product and process innovation) and allowing for the moderating impact of firm-level characteristics. We use the ascertained patterns of persistence to comparatively evaluate various sources (and underlying theoretical accounts) of state dependence.

© 2013 Published by Elsevier B.V.

1. Introduction

The persistence of innovation describes the influence of past innovation activities on current and future innovation behavior and success. Innovation persistence has far-reaching ramifications for topics in innovation theory and practice, strategic management, and public policy. At the macroeconomic level, a hypothetical true persistence of innovation substantiates endogenous growth models. True persistence recognizes incumbent firms and cumulative knowledge building as mainsprings of innovation and economic growth, and at the same time dismisses new entrants and their ‘creative destruction’ (i.e., it represents a clinching argument in the longstanding debate between the Schumpeter Mark I and Mark II models, see [Malerba and Orsenigo, 1996](#)). At the microeconomic level, this continuous loop of innovation represents an important instance of the ‘success breeds success’ hypothesis ([Flaig and Stadler, 1994](#)), and provides a major building block of sustained competitive advantage and lasting interfirm performance differences – hallmark issues of strategic management. A public policy perspective of true persistence underscores important lessons for designing and targeting innovation support programs. True persistence potentially implies intertemporal spillovers relevant for evaluating the impact of innovation programs. It also casts doubt on

the wisdom of subsidizing start-up firms and new market entrants when innovation promotion is the primary funding goal.

With so many far-reaching implications, the persistence of innovative activities increasingly garners innovation researchers’ attention. Although recent studies have significantly advanced our knowledge about this phenomenon (Section 2.1 provides a short survey), there are still substantial rifts in our understanding of innovation persistence, its causes and consequences. First, existing research focuses exclusively on a narrow and technologically oriented notion of innovation. Product and process innovation are the sole subjects of these studies, while little is known about the persistence of non-technological forms of innovation, particularly organizational innovation. Despite a limited availability of data (e.g., most countries grant patents exclusively to technological innovation), this lopsidedness is unwarranted. Ample evidence exists proving organizational innovation has a no less profound impact on a firm’s performance and growth than technological innovation (e.g., [Armour and Teece, 1978](#); [Battisti and Stoneman, 2010](#); [Damanpour et al., 1989, 2009](#); [Mol and Birkinshaw, 2009](#); [Schmidt and Rammer, 2007](#); [Teece, 1980](#)). Furthermore, studies on dynamic capabilities and related topics undergird lasting differences in the ‘organizational innovativeness’ of firms. These studies show a significant variance in the continuity not only of technological innovation, but also of organizational renewal and change (e.g., [Barreto, 2010](#); [Becker et al., 2005](#); [Teece, 2007](#); [Wang and Ahmed, 2007](#); [Zander and Kogut, 1995](#)). To date, however, no study has systematically probed the persistence of organizational innovation.

Second, existing empirical studies draw a fine-grained picture of the patterns of persistence in innovation, but remain largely

* Corresponding author at: University Seeburg Castle, Seeburgstrasse 8, 5201 Seekirchen am Wallersee, Salzburg, Austria.

E-mail address: achim.hecker@uni-seeburg.at (A. Hecker).

silent concerning their underlying mechanisms. Early works study only weak and generic notions of persistence in terms of “some degree of continuity in innovative activities over time” (Cefis and Orsenigo, 2001: 1141f.). Recent contributions by Antonelli et al. (2012), Clausen et al. (2012), Máñez et al. (2009), Peters (2009), and Raymond et al. (2010) make methodological progress by differentiating between true and spurious state dependence (Heckman, 1981a,b). These works explain some observable persistence as a reflex of permanent (or serially correlated), but unobserved firm characteristics. Regarding true persistence, the effect of past innovations on current innovation behavior independent of the continuous influence of unobserved factors, knowledge about its sources is minimal. Currently published empirical studies contribute little to validating and discriminating between competing theoretical explanations of persistence in innovation (i.e., resource constraints-, sunk costs-, and competence-based accounts surveyed in Section 2.2).

This paper addresses these gaps in current research by tackling two research questions: (i) What are the differences in persistence patterns between (various types of) technological and organizational innovation? (ii) What conclusions can we draw from the empirically determined persistence patterns about the sources and theoretical accounts of true innovation persistence? To conceptualize the different types of innovation we turn to the definitions from the “Oslo Manual” of the OECD and Eurostat. Following this guideline, organizational innovation means “the implementation of a new organizational method in the firm’s business practices, workplace organization or external relations (. . .) that has not been used before in the firm and is the result of strategic decisions taken by management” (OECD/Eurostat, 2005, p. 51). Analogous to technological innovation, persistence of organizational innovation refers to the degree of continuity of organizational renewal, i.e., of introducing novel organizational methods in the firm’s business practices, workplace organization, or external relations. While persistence of technological innovation is usually attributed to sustained R&D capabilities, research on organizational change and dynamic capabilities relate the ability of continuous organizational renewal to underlying (dynamic) capabilities of organizational learning and adaptation (e.g., Barreto, 2010; Becker et al., 2005; Teece, 2007; Wang and Ahmed, 2007; Zander and Kogut, 1995).

The empirical analysis draws on a panel data set constructed from three waves of the German Community Innovation Survey (CIS) covering 2002–2008 (i.e., CIS IV, CIS 2007, and CIS 2009), which is analyzed using dynamic random effects probit modeling. Our results show true persistence only for some types of technological innovation (more precisely, for product innovation new to the market), but neither for technological innovation new merely to the firm, nor for organizational innovation. Factors such as firm size, public support, or affiliation to a firm group moderate the effect of past innovation. With respect to the various theoretical accounts of innovation persistence discussed in the literature and considered in more detail in the following section, the results speak to the validity of the sunk cost perspective, mixed support for the resource constraints perspective, and least support for the competence-based perspective. Supplemental to the results is a considerable influence of previous technological innovation on the firm’s inclination to adopt organizational innovation. None of the existing theoretical accounts on innovation persistence accounts for this finding. Instead, the results give credence to a theoretical perspective, envisioning technological innovation as ‘engine of organizational renewal’ (Danneels, 2002; Dougherty, 1992).

This study continues under the following organization. Section 2 succinctly surveys the empirical literature on innovation persistence and summarizes three widely held theoretical accounts of this phenomenon. Section 3 describes the econometric approach and the data. Section 4 reports on the main findings. Section 5

discusses the empirical results. Finally, Section 6 concludes with an examination of the limitations encountered in this study.

2. State of research and open questions

2.1. Empirical research on innovation persistence

Since first coming to the attention of innovation researchers, empirical studies concerning the persistence of innovation have flourished. Several works empirically research the existence of persistence in innovative activities for product and process innovation (e.g., Antonelli et al., 2012; Clausen et al., 2012; Flaig and Stadler, 1994; Martínez-Ros and Labeaga, 2009; Roper and Hewitt-Dundas, 2008), across different countries (e.g., Cefis and Orsenigo, 2001; Malerba and Orsenigo, 1999), for different industries (e.g., Cefis and Orsenigo, 2001; Raymond et al., 2010), the service sector (e.g., Peters, 2009), innovation inputs (e.g., Peters, 2009; Máñez et al., 2009) and outputs (e.g., Cefis, 2003; Geroski et al., 1997; Malerba and Orsenigo, 1999; Raymond et al., 2010; Roper and Hewitt-Dundas, 2008), and on the basis of patent data (e.g., Cefis, 2003; Cefis and Orsenigo, 2001; Malerba and Orsenigo, 1999), survey data (e.g., Antonelli et al., 2012; Clausen et al., 2012; Flaig and Stadler, 1994; Peters, 2009; Raymond et al., 2010; Roper and Hewitt-Dundas, 2008) and even qualitative case study research (Roper and Hewitt-Dundas, 2008).

So far, the results are mixed and do not provide a consistent picture of the phenomenon. Several studies relying on patent data find low levels of persistence in general, combined with bimodality, i.e., strong persistence for great innovators and non-innovators. Patent data are, however, criticized for providing only an incomplete and distorted measure of a firms’ innovation activity and persistence (Antonelli et al., 2012; Clausen et al., 2012; Raymond et al., 2010). Studies using R&D and innovation survey data consistently show higher levels of innovation persistence. Yet, innovation persistence is found to differ significantly across sectors, firm size classes, and types of innovation (i.e., product and process innovation).

The heterogeneity of results indicates the need of further explorative research to accumulate a body of empirical evidence to serve as the basis for a sound and consistent understanding of innovation persistence. What is more, empirical research so far suffers from some lopsidedness, as existing studies exclusively focuses on a narrow and technologically oriented notion of innovation. To the best of our knowledge, this study is the first attempt to systematically investigate the persistence of organizational innovation.

2.2. Theoretical accounts of innovation persistence

While we are beginning to grasp the incidence and implications of persistence in innovative activities, its underlying causes are less understood. Studies of innovation persistence have suggested and applied various theories to explain this phenomenon and make sense of their findings. These attempts can largely be sorted into three distinct theoretical perspectives that rely on contrasting underlying mechanisms and determinants, and draw on diverse research traditions.

First, the *resource constraints perspective* starts from the observation that firms frequently face serious financial constraints in funding their innovation projects. Innovation activities are often capital-intensive, risky, and difficult for external financiers to assess (Arrow, 1962). This fact impedes the access to capital markets and other external sources of finance (Czarnitzki and Hottenrott, 2010; Hall, 2002). A record of previous successful innovation alleviates these restrictions, as the revenues help provide internal funding for further innovation activities. Empirical studies show that internal cash flows represent a main source of R&D spending (Brown et al.,

Download English Version:

<https://daneshyari.com/en/article/10483100>

Download Persian Version:

<https://daneshyari.com/article/10483100>

[Daneshyari.com](https://daneshyari.com)