Eco-Innovation: Drivers, Barriers and Effects – A European Perspective

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Abstract

Innovations are key to economic outcomes, both as an engine of economic growth and the development of economies and as a prerequisite for the survival and growth of firms (Schumpeter, 1934). In view of this, innovation – and with it environmental innovation – has been moved into the centre of the Europe 2020 strategy for smart, sustainable and inclusive growth and job creation. The European Commission defines eco-innovation as *'… any form of innovation resulting in or aiming at significant and demonstrable progress towards the goal of sustainable development, through reducing impacts on the environment, enhancing resilience to environmental pressures, or achieving a more efficient and responsible use of natural resources*' (2011: 2).

In the context of the Europe 2020 strategy, eco-innovation is considered to play an important role due to two key advantages it generates: on the one hand, eco-innovation can address the EU's current key societal challenges by tackling climate change, helping to improve environmental protection and resource efficiency of the economy or to guarantee secure, clean and efficient energy. On the other hand, eco-innovation can contribute strongly to the EU's competitiveness and growth, which have suffered from the recent global economic and financial crisis. Hence, to fully embrace and harness its full potential, the uptake of eco-innovation needs to be fostered and facilitated and still existing barriers need to be dismantled and effective policies implemented to promote, accelerate and diffuse eco-innovation in the EU.

This paper sheds light on the key drivers of and barriers for eco-innovations and determines their effects on competitiveness. It uses firm-level data from the latest wave of the Community Innovation Survey (CIS-2014), pertaining to the period 2012-2014, from two different data sources: (i) Eurostat's microdata save centre for several EU Member States and (ii) the Mannheim Innovation Panel (MIP-2014) for German firms from the Centre of European Economic Research (ZEW). The broad EU sample is further split up into three sub-samples, in accordance with the relative eco-innovation performance of EU Member States as determined by the Eco-Innovation Scoreboard: (i) eco-innovation leaders, (ii) average eco-innovation performers, and (iii) countries catching-up in eco-innovation. This split allows to highlight differences across country groups as concerns drivers, barriers and effects of eco-innovation and to show what sets firms located in countries leading on eco-innovation apart from those located in countries which lag behind on eco-innovation. The MIP-2014, on the other hand, allows to shed light on additional aspects the standardized CIS is unable to address, such as particular motives for eco-innovation, most importantly in terms of the role of demand and public policies. The analysis looks at both, innovation in general as well as eco-innovation, in particular, which helps to identify important differences between innovation and eco-innovation. Eco-innovations are further distinguished in terms of different process and product eco-innovations, which helps to draw a more differentiated picture of the particular drivers, barriers and effects of each individual eco-innovation. Methodologically, a three-step CDM-model is used for this purpose.

Results show that investments either in the form of investments in R&D or of investments in machinery, equipment, software and buildings are key drivers of eco-innovations. However, these forms of investments are of different importance in the three country groups. For instance, the relative weak effect of R&D investments in countries catching-up in eco-innovation is reflective of the inefficiencies in the eco-innovation production process and insufficient innovation capabilities of firms located there. Furthermore, the strong effect of fixed capital investments (machinery, equipment,

software and buildings) in countries with average eco-innovation performance and countries catching-up in eco-innovation points to the need to expand and upgrade the prevailing and probably still insufficient physical infrastructure to spur eco-innovation. Furthermore, the analysis of the German sample stresses the importance of expected future demand and rising costs for energy and other resources as incentives for eco-innovation but only finds a limited role for public policy. In particular, while public financial support encourages eco-innovations, little support is found for the Porter hypothesis, which attributes a strong role to regulations to simulate eco-innovations (Porter and van der Linde, 1995). However, a further differentiation of eco-innovations into different process and product eco-innovations shows that regulations do matter, but only for some particular types of eco-innovations. This selective effect of regulations suggests that they are not a one-size-fits-all type of policy tool but are effective in spurring particular types of eco-innovations. Contrary to expectations, international market orientation is a barrier for eco-innovations, irrespective of country group or type of eco-innovation considered. Finally, rather consistently, eco-innovations are commercially beneficial – in terms of a productivity-enhancing effect – which is however lower than for innovations in general.