Preface

In the last 50 years the need to meet increasing demands for energy, food and water has produced a rapid and extensive alteration of ecosystems, soil degradation, loss of biodiversity and deforestation. At the same time, the growing process of industrialisation across the world has contributed to rising greenhouse gas emissions, air and water pollution, expanding waste volumes, desertification and chemical pollution. Given these premises, the key challenge for the coming years will be to reduce the environmental footprint of production and consumption patterns by promoting a transition towards a more resource-efficient economy. To make this happen, a significant change in the way goods are produced and used is needed, along with a shift in the existing socio-technical structures. Although such a change is typically associated with higher economic costs, it hides large economic potential along with numerous opportunities for companies to engage in innovations that contribute towards improving environmental quality. These kinds of innovations (generally labelled in a number of different ways, for example, ‘eco-innovations’, ‘environmental innovations’, ‘green innovations’, ‘sustainable innovations’ and so on) play a crucial role in the transition process towards a green economy, by contributing towards the successful management of the environment as well as by developing new business opportunities for companies. The term ‘eco-innovation’ represents an umbrella that covers innovations potentially developed in any economic sector and not only in the eco-industries, that is, in industries that specifically produce goods and services to measure, prevent, limit, minimise or correct environmental damage as well as problems related to waste, noise and ecosystems. Therefore, robust and reliable statistics about the economic potential of eco-innovations are not available.

When a certain technological paradigm is dominant, innovations happen over time along technological trajectories. In particular, it is possible to identify at least five major technological trajectories since the late eighteenth century, referred to as ‘waves of innovation’ (Freeman and Soete, 1997). The first occurred in the late 1700s and was based on the diffusion of textiles, water power and mechanisation. The second, at the end of the 1800s, on steam power, trains and steel. The third, in the first part of the 1900s, on electricity, chemicals and cars. The fourth, by the middle of
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In the late twentieth century, on electronics. The fifth, in the 1990s, on computers and IT. Finally, the sixth wave, that should have already started, seems to be founded upon the implementation of sustainable technologies.

The diffusion of green technologies certainly represents an important step in achieving a green economy. However, an increasing body of literature (Altenburg and Pegels, 2012; Foxon et al. 2008; Geels and Schot, 2007) claims that the transition towards environmental sustainability requires changes at the systemic level, which also involve social and institutional dimensions. In this framework, the analysis of eco-innovations should be carried out in their dynamic and multidimensional aspects, by taking into account their co-evolution with social and institutional systems. In contrast, despite their increasing diffusion, eco-innovations are not fully conceptualised and the lack of a universally recognised definition in the literature makes eco-innovations a concept with unclear outlines. In particular, studies on eco-innovations seem to exhibit a general bias towards green technologies. However, eco-innovations can also include non-technological innovations (for example, the organisational ones), which can positively affect the achievement of environmental sustainability goals. Similarly, there is no mention in the literature about the important distinction between incremental and radical eco-innovations in the transition process towards a green economy. Moreover, literature has devoted significant efforts towards the investigation of mechanisms that foster or hinder companies to eco-innovate. However, not all the drivers and barriers of eco-innovations seem to be fully understood. In particular, despite the significance of finance influencing companies’ investment decisions being widely recognised in the literature (see, for instance, Spielkamp and Rammer, 2009; Lazonick, 2004; O’Sullivan, 2004), there exists scant empirical research that investigates the potential financial constraints faced by eco-innovating companies.

Therefore, the present book aims to increase knowledge about eco-innovations by investigating the extent to which financial constraints of companies hinder their eco-innovative decisions. In particular, eco-innovations are analysed in their multidimensional nature, by taking into account their co-evolution with the existing systems and structures. In particular, the book presents a descriptive model that is assembled from the fundamentals of the well-established theoretical setting of the evolutionary theory, in an attempt to capture eco-innovations’ contribution to the transition from the current (unsustainable) regime to a green economy where eco-innovations become the market standard and environmental issues are fully integrated into all economic processes. In this context, the model tries to identify the extent to which financial constraints can hinder the eco-innovative behaviour of companies and, consequently, the
transition process towards a more sustainable regime. More specifically, the model is grounded in the framework of the multi-level perspective (Geels, 2002; Rip and Kemp, 1998), which describes the socio-technical transitions in terms of three linked levels: socio-technical landscape (the macro-level), socio-technical regime (the meso-level) and niche-innovations (the micro-level). According to the model, niche-innovations struggle against the existing regime and therefore require changes in the socio-technical regime (for example, in consumer practices, public policies and so on) in order to sufficiently propagate. When the socio-technical landscape exerts a destabilisation pressure on the existing regime (and eventually on the niche), niche-innovations have the opportunity to emerge and compete with the existing regime, and eventually enter the mainstream markets. In this framework, the book assesses the role played by financial constraints upon the process of sustainability transitions by integrating the financial dimension into the original model. In particular, the model describes how financial constraints can prevent the development of eco-innovations, both at regime and niche levels, jeopardising the alignment process between the three aforementioned levels (landscape, regime and niche), which is necessary for a sustainability transition to occur.

Subsequently, the book presents the results achieved from two distinct surveys that investigate to what extent financial constraints can affect the process of a sustainability transition. In particular, the first survey focuses upon the socio-technical regime by analysing the impact of financial constraints on the implementation of incremental eco-innovations. The second explores the extent to which financial constraints may affect the development of radical eco-innovations at niche level, hindering the possibility for a niche to enter the dominant regime. More specifically, the regime-level analysis carries out a comparative study between English and Italian manufacturing industries. As will be discussed in the book, eco-innovations are not limited to eco-industries, since they are an integral part of the innovative effort of companies across different industries. From this perspective, English and Italian manufacturing industries exhibit a large percentage of innovative enterprises as well as high levels of environmental protection expenditure, making manufacturing companies a potentially significant matter of analysis. Moreover, England and Italy are characterised by contrasting financial system architectures that literature recognises to be among the most significant determinants of financial constraints. The book develops and employs a novel approach for recognising the eco-innovative enterprises. Starting from a sample of English and Italian manufacturing companies drawn from already existent databases, the regime-level questionnaire identifies which enterprises from the sample eco-innovated and what they did in making an
eco-innovation, before proceeding with more specific questions including those on financial constraints. The distinctive characteristic of this approach is that companies surveyed are not pre-supplied with a definition of eco-innovation, but, instead, are asked to offer their own definition of what it is. This allows understanding of companies’ viewpoints on eco-innovations and avoids forcing them to adopt a definition that they may not understand or agree with. The data collected made it possible to draw a descriptive picture about the characteristics of the eco-innovative companies surveyed.

Similar to the regime-level investigation, the niche-level analysis focuses upon a comparative study between English and Italian eco-innovative companies. In this case, enterprises surveyed are those operating in the anaerobic digestion and biogas niche. This allows simultaneously taking into account the most relevant domains that can actively contribute to the transition towards a more sustainable regime, that is, energy, food and mobility. Indeed, the anaerobic digestion and biogas enable the producing of energy starting from a number of different feedstocks, including agricultural residues and food waste, and can be used for heating or as an alternative renewable fuel for transport. Data collected are used to draw a descriptive analysis about the niche companies surveyed as well as to assess the impact of financial constraints upon the niche readiness. To this end, data are analysed by means of the social network analysis in order to investigate the effect of financial constraints upon the three key niche mechanisms that normally define the development of a technological niche, namely: expectations, learning process and network formation.

REFERENCES

