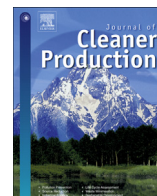




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Regional policies and eco-industrial development: the voluntary environmental certification scheme of the eco-industrial parks in Tuscany (Italy)

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ABSTRACT

Industrial ecology is presented in the literature as both a policy tool and an academic theory. This paper discusses a voluntary certification scheme adopted by the regional government of Tuscany (Italy) as a policy tool to disseminate the concepts of industrial ecology. The approval of a regional regulation represents the first adoption in European environmental and industrial policies of a voluntary tool aimed at stimulating the creation and dissemination of eco-industrial parks. This new certification method is analysed by focusing on the prevention of pollution. The criteria required to obtain the qualification, and the roles and responsibilities of all the actors involved are outlined. Finally, the strengths and weaknesses of the certification scheme are highlighted and the Italian standard compared with the national standard issued in China by the State Environmental Protection Administration. The findings contribute to the discussion of policy measures aimed at disseminating the concepts of Industrial Ecology including a tool based on voluntary co-operation and third-party certifications.

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1. Introduction

Industrial ecology (IE) theory has mainly been developed by drawing on natural science and engineering-oriented frameworks (Korhonen and Strachan, 2004). Early analyses of IE focused on the physical flows of materials and energy within industrial systems, with less emphasis on the development of policy mechanisms (Opoku, 2004). This is confirmed by one of the most cited definitions of industrial symbiosis (IS), one of the key concepts of IE: “IS engages traditionally separate industries in a collective approach to competitive advantage involving physical exchange of materials, energy, water and by-products” (Chertow, 2000).

The definition of IS has since been reinterpreted, for example Lombardi and Laybourn (2012) define IS as a tool to spread innovative green growth by fostering “eco-innovation and long-term cultural change”.

Also the importance of policy action to support the spread of IE concepts has been revised. Lombardi et al. (2012) highlight how IS

has been documented in six continents at all policy levels (international, national, regional and local) as “a strategic policy tool for economic development, green growth, innovation and resource efficiency”. Yu et al. (2014) studied research in the field of IS in the period 1997–2012. The study reveals the evolution of IS from practice-oriented research toward more systematic and diverse topics. The analysis confirms the main findings of Lombardi et al. (2012) and classifies the domain of IS into five main themes: wastewater treatment and management; energy efficiency; solid waste management; self-organization of IS systems; and policy making and evaluation for IS and eco-industrial park (EIP) projects. The importance of IE policy implications is emphasized by Von Malmberg (2004) who claims that most studies on industrial ecology in practice “seem to ignore the roles of governments in facilitating (or obstructing) industrial ecosystem development”. He invites other authors to contribute to this topic and confirms that “policies and actions taken by governments and public authorities on different levels constitute important institutional settings for the development of industrial ecosystems”. Lehtoranta et al. (2011) argue that few studies exist on the overall impact of policy instruments aimed at promoting the design of eco-industrial parks. In addition, this literature highlights how both policies and practical

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experience are also still too focused on the reuse and recycling of materials rather than the implementation of pollution prevention at the park level (Geng et al., 2012).

In recent years several articles have thus been published on the policy implications of IE (Geng et al., 2009; Mirata, 2004). In the described literature framework, this paper aims to contribute to this topic by describing an innovative policy initiative in Italy based on pollution prevention in order to stimulate, support and coordinate the diffusion of eco-industrial parks.

Section 3 describes a voluntary certification scheme adopted by the regional government of Tuscany as a policy tool to disseminate IE concepts. The scheme follows a “holistic” method, which has strong links with voluntary policy tools. This “holistic vision” emphasizes the need for an innovative and co-operative approach to local development, based on voluntary, public-private partnerships and on the ability to collaboratively manage economic objectives, with the approval of local communities. Many studies carried out in the last decade in Italy have provided evidence that a holistic approach, based on co-operation between economic, social and institutional actors and on bottom-up local policy making, yields better results for the area, both in environmental and competitive terms (Daddi et al., 2012).

Section 4.1 compares the Tuscan standard and a similar certification standard approved by the Chinese State Environmental Protection Administration. The goal is to identify the common elements that are both “holistic” and are based on a voluntary approach. The building blocks of an innovative stream of policies inspired by IE can thus be identified. This comparison also highlights the relative weaknesses that must be overcome when implementing such an approach in other contexts. This means that it can be verified whether such weaknesses are specific to a particular national institutional and policy framework or whether they are likely to be true in all cases.

2. Policy approaches to industrial ecology concepts

The concepts of IE and IS find their concrete applications in the creation and development of EIPs. One of the most well-known definitions of an EIP was provided by the United States Environmental Protection Agency (Martin et al., 1996): “a community of manufacturing and service businesses seeking enhanced environmental and economic performance by collaborating in the management of environmental and reuse issues. By working together the community of businesses seeks a collective benefit that is greater than the sum of the individual benefits each company would realise if it optimised its individual performance only”.

The aim is to maximise the use of co-products and by-products, whilst reducing the residual products of the processes (Zhu and Cote, 2004). The definition of EIP has since gone beyond the strict connection with the concept of by-product transfer. It has been enriched by other elements such as EIP networks (Gibbs and Deutz, 2007), management issues (Mirata, 2004), and utility sharing and joint service provision (Chertow et al., 2008).

At an international level, different approaches have been adopted by policy makers to apply the industrial ecology principles and support the dissemination of EIPs. As a policy concept, industrial ecology has informed a variety of practical initiatives, particularly through the promotion and development of EIPs. Korhonen et al. (2004) discussed how industrial ecology can be a bridge from “the descriptive analysis of materials and energy flows in industrial systems toward a prescriptive framework offering concrete solutions and practical measures for policy makers and business managers”.

The policies adopted to disseminate EIPs can be categorized according to two main types of environmental approaches: 1. direct

regulation (also known as ‘command and control’), and economic instruments (especially financial subsidies); 2. voluntary tools.

Direct regulation and economic instruments seem to be preferred by governments, while local authorities are more likely to adopt voluntary tools. Direct regulation and economic instruments have been applied in many countries in Europe (Eilering and Vermeulen, 2004; Heeres et al., 2004), North America (Cohen-Rosenthal, 1996; Hendricks and Giannini-Spohn, 2003) and Asia (Geng and Doberstein, 2008; Shi et al., 2010; Zhang et al., 2010) to promote specific eco-industrial initiatives.

Lehtoranta et al. (2011) report how Finland does not have direct policy instruments to promote IE concepts although the development of some EIPs has been encouraged using other political instruments. The authors identify tax relief for the use of by-products as a possible tool for resource efficiency. In addition, the authors consider a stronger taxation of transport and fuels as well as limiting end-of-pipe emissions through environmental permits as an indirect means to promote the development of EIPs.

Stricter legislation or economic policies aimed at promoting the spread of EIPs are also common in Asia. For example, the development of industrial symbiosis in Ulsan city, the main industrial city of South Korea, was promoted by direct regulation initiatives consisting in strict legislation and environmental standards (Park et al., 2008). In China’s Tianjin industrial development, local subsidies for high-quality infrastructure stimulated the development of a high number of symbiotic relationships. Shi et al. (2010) identified 81 cases of industrial symbiosis in this industrial area supported with this economic instrument.

Nevertheless, some authors argue that in order to implement IE concepts, “combinations of active governmental policy and voluntary and proactive actions by private firms are needed” (Korhonen et al., 2004).

Voluntary tools are adopted less often to implement IE concepts and are discussed minimally in the literature regarding the policy approaches linked with IE (Tudor et al., 2007; Gibbs and Deutz, 2007). In addition, very few studies are related to policies that involve issuing voluntary certifications to reward the environmental development of the areas. Despite this, in other fields of the application of Sustainable Consumption and Production policies, these instruments have proved effective in enhancing both environmental and economic performance in industrial companies (Iraldo et al., 2009; Daddi et al., 2011) as well as in the public administration (Daddi et al., 2013).

Costa et al. (2010) investigate the different waste policy interventions as a leverage to spread IS initiatives in Denmark, the UK, Portugal and Switzerland. Denmark opted for the strict use of regulatory and economic instruments, while the UK, Portugal and Switzerland applied a mix of policy tools including voluntary instruments.

Sanches Pereira et al. (2009) describe the current “command and control” approach used by policy makers in Brazil. They argue for an evolution of Brazil’s IE policies from “command and control” to “command and covenant” based on shared responsibility, shared membership and shared decision making among governments and corporations. They suggest that the new approach would help create a system with higher eco-innovation and competitiveness.

Tudor et al. (2007) identify the main drivers and limitations for the successful development of EIPs. They list a group of measures to enhance the success of EIPs and point out the need for a voluntary initiative to better implement the IE principles: “the initiative should come from the firms and not from government”.

By analyzing public-private partnerships in Sweden, Von Malmberg (2004) shows that local authorities use their policy instruments to act as “knowledge banks” or “knowledge brokers”. As “knowledge banks”, local authorities hold the knowledge that is

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