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Comparing policy strategies for a transition to a bioeconomy in Europe: The case of Italy and Germany

Enrica Imbert[a], Luana Ladu[b], Piergiuseppe Morone[a,*], Rainer Quitzow[b,c]

[a] Bioeconomy in Transition Research Group (BiT-RG), Unitelma Sapienza, University of Rome, Viale Regina Elena, 295, 00161 Rome, Italy
[b] Technische Universitaet Berlin, Strasse des 17, Juni 135, 10623 Berlin, Germany
[c] Institute for Advanced Sustainability Studies, Berliner Strasse 130, 14467 Potsdam, Germany

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ABSTRACT

Grand societal challenges call for a transition from a society based on finite fossil resources towards a bio-based economy, based on renewable resources. Such a transition should involve not only the energy sector, but also the manufacturing sector. As acknowledged in the European Bioeconomy Strategy, the promotion of a bioeconomy is dependent on policy efforts across a wide spectrum of policy spheres. In the literature on sustainability transitions, this insight is captured in the increasing interest in the concept of policy mixes or policy strategies for promoting transitions to more sustainable modes of production and consumption. In this paper, we present a comparative analysis of bioeconomy strategies in Germany and Italy with a focus on the bioplastics sector. The paper adds to the existing literature on policy mixes by extending the concept of a policy strategy and applying it for the purpose of the comparative analysis. Moreover, the analysis is linked to the discussion on multi-level systems of governance in the European Union. A key finding is that linkages between the two policy strategies via policy making within the European Union have helped in reinforcing the nascent transition to a bio-based economy in Europe.

1. Introduction

The traditional take-make-waste economic model is unfit to face major economic and demographic world trends – including population growth and global middle class explosion [1] – provided also that fossil resources are dwindling and set to get ever more expensive [2]. Hence, a transition away from a fossil-based society is needed [3]. In this transition the promotion of the bioeconomy,[1] in which production processes are based on sustainable biological resources, plays an important role. Indeed, the bioeconomy is becoming a key segment of the European economy, with an estimated annual turnover of 2.2 trillion euros and 22 million people employed, representing 9% of the total employment in the EU [4].

The European Commission (EC) has pointed out the following advantages and opportunities of a transition to a bioeconomy, including: (1) reduction of CO_2 emissions and resource and land-use efficiency; (2) new business opportunities and growing EU global market leadership through cascading use of biomass and reuse of waste materials; (3) new integrated research structures, promoting European leadership through knowledge and technology transfer; and (4) economic and employment stimulus to rural and regional development.

At the same time, potential risks should not be underestimated. These include: (1) competition between food supply and biomass production; (2) reindustrialisation and centralisation of the agri-food production; (3) over-exploitation of natural resources and loss of biodiversity; (4) loss in consumer trust (EC, 2011). The risk of food insecurity has taken on particular salience in public debate [6]. As a result, secondary biomass feedstock from several waste streams (e.g. food waste) is beginning to replace dedicated crops. Modern biorefineries now generally aspire to draw on such second generation feedstock [7,8]. Indeed, both Italy and Germany have taken steps in this direction. Nevertheless, second generation biorefineries still represent a small industrial niche, facing strong economic challenges [9] and strongly dependent on public policies [10].

Both seizing the opportunities of innovation and technological change and mitigating potential risks of a bioeconomy depends strongly

* Corresponding author.
E-mail address: piergiuseppe.morone@unitelma.it (P. Morone).

[1] The bioeconomy is defined by the European Commission as the production of renewable biological resources and the conversion of these resources and waste streams into value added products, such as food, feed, bio-based products and bioenergy via innovative and efficient technologies provided by industrial biotechnology [5].

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on how policy and regulation is employed in governing the transition process. At the same time, the bioeconomy does not represent a discrete policy domain or sector, but it spans a variety of traditional and emergent policy fields and industrial sectors. According to the EC definition,[2] these include the fields of energy, agriculture, forestry, fisheries, food, pulp and paper production, and parts of chemical and biotechnological production as well as different areas of environmental policy and management – e.g. natural resource and land management, waste management, climate policy [6].

Hence, as acknowledged in the European Bioeconomy Strategy, the promotion of a bioeconomy is dependent on policy efforts across a wide spectrum of policy spheres (EC, 2012). In the literature on sustainability transitions, this insight is captured in the increasing interest in the concept of policy mixes or policy strategies for promoting transitions to more sustainable modes of production and consumption. It has been acknowledged that real world transitions to more sustainable socio-technical systems are influenced by multiple policy instruments from different policy domains and across different levels of government [12–15]. In this vein, an increasing number of scholars have raised questions about how to design, assess and compare policy mixes for promoting sustainability transitions [13,15–17].

After a number of primarily conceptual contributions, related concepts and analytical frameworks are being refined and tested empirically. This paper contributes to this growing literature by applying and extending the existing concept of a policy strategy [15] and applying it to a comparative analysis of bioeconomy strategies in Germany and Italy. It focuses in particular on the bioplastics sector, a major area of innovation and market growth in recent years [18]. Conceptually, the paper adds to the literature by extending the argument for the purpose of the comparative analysis, while linking it to the discussion on multi-level systems of governance.

The remainder of the paper is as follows: Section 2 presents the paper's theoretical background and analytical framework; Section 3 introduces the two case studies and the methods used for data collection; Section 4 reports the main results for each of the case studies; Section 5 provides a comparative analysis of the policy strategies, and Section 6 presents conclusions, linking the results to the broader debate on policy mixes.

2. Theoretical background and framework for the analysis

2.1. Policy mixes for sustainability transitions

As indicated, a number of scholars have made efforts in recent years to develop improved concepts and approaches for assessing and comparing policies for the promotion of transitions to more sustainable socio-technical systems. In earlier work on policy mixes, a particular focus was placed on the interaction of different policy instruments [19] and on the importance of designing coherent policy mixes [20]. Others have focused attention on how policy mixes develop over time on the basis of pre-existing governance arrangements. They highlight a variety of processes in the practice of policy making that lead to increasingly complex and frequently incoherent instrument mixes [21].

In recent years, scholars from the field of innovation and sustainability transitions have developed a broader conceptualization of the policy mix concept. These efforts have aimed at developing a framework for the empirical analysis of policy mixes in support of innovation in environmentally-friendly technologies and the related technological innovation systems. In doing so, these authors extend the concept beyond the realm of policy instruments and highlight in particular the dynamic nature of policy making. In addition to the narrow concept of an instrument mix, Rogge and Reichardt's [17] policy mix framework includes what they refer to as the policy strategy, consisting of policy objectives and principal plans, as well as policy processes. Quitzow [15], on the other hand, defines policy strategy as an overarching concept. Building on concepts from the literature on strategy and strategic management, Quitzow's policy strategy concept encompasses not only policy objectives, policy measures and policy processes but also the institutional capacities needed for policy development and implementation. Moreover, it highlights the fact that sustainability transitions and the related policies are strongly dependent on existing political opportunity sets and prevailing governance arrangements and are riddled with normative value judgements. It thus deemphasizes the importance of policy coherence, a central pillar of previous conceptualizations, and places stronger emphasis on the identification of trade-offs and the relationship between the external opportunity set and the chosen strategy.

A recent contribution by Kivimaa and Kern [16] has extended the discussion on policy mixes from its focus on the promotion of innovation in emerging technology fields to the broader process of sustainability transitions. They propose a framework for the analysis of policy mixes aimed at "creative destruction" rather than "mere niche creation". In doing so, the authors aim to break out of a discussion focused primarily on policies for the development of clearly delineated, technology-specific innovation systems. In this way, their approach is in sync with the increasing momentum of energy transition processes in a number of countries and the increasing need to address the politically challenging task of phasing out incumbent technologies. In terms of their underlying policy mix concept, however, they remain focused on the original concept of an instrument mix rather than the broader concepts proposed by Rogge and Reichardt [17] and Quitzow [15].

In this article, we build on and further develop the concept of a policy strategy proposed by Quitzow [15] to compare the policy strategies for the promotion of the bioeconomy in Italy and Germany, focusing particular attention of the field of bioplastics. In doing so, we seek to add to the literature in the following ways. Firstly, we apply the policy strategy concept for conducting a comparative analysis of two countries. While explicitly designed for this purpose, Quitzow [15] employs the proposed framework for the assessment of a policy approach in a single country, i.e. India's policy strategy for the promotion of solar energy. In this article, we make the first attempt at applying the framework to conduct a comparative analysis of policy strategies. The concept is considered particularly useful for this purpose, as it emphasizes the importance of country-specific circumstances for the design of the policy approach. For the purpose of this comparison, we propose a number of additional concepts aimed at categorizing different types of policy strategies. Secondly, we place particular attention on how the policy strategies are linked to policy making at the European level. We consider how the policy strategies are inter-linked within the European multi-level system of governance.

2.2. Comparing policy strategies

For the comparison of the chosen policy strategies, we apply a slightly simplified version of the policy strategy concept proposed in Quitzow [15]. The framework proposed in Quitzow [15] provides a detailed set of criteria for the assessment of each element of the policy strategy, i.e. *policy objectives, policy measures, the policy (or strategy) process and institutional (or strategic) capacities*. The simplified framework proposed in this paper focuses primarily on the *comparison* rather than the *assessment* of these elements. In this vein, the analysis places greater importance on the characterization of the policy strategies and the identification of the key similarities and differences between the two countries and less on the assessment of the strengths and weaknesses of the policy strategies. In doing so, it does not assume the existence of collective agency on the part of actors in the two countries,

[2] This definition, however, excludes different development directions like ecological agriculture etc. For a comprehensive literature review see Bugge et al. [11] who identified three visions of the bioeconomy: the bio-technology vision; (2) the bio-resource vision; and (3) the bio-ecology vision.