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ASSEGNO DI RICERCA

Policies and equity financing instruments to support circular economy practices

Theoretical background

The threats of environmental issues linked to the global climate change have been recognized to be one of the most serious problems challenging the world (Bailey and Tatikonda, 2018; Lee et al., 2015; Lerner, 2010; Zhang et al., 2019). The transition to climate neutrality and alignment with EU Green Deal-inspired policies offers an opportunity for clean-tech firms to engage in transformative climate and innovation actions that meet the urgency of the climate crisis in this decade. In particular, the circular economy (CE) emerged as an alternative model to the linear system to foster sustainable development and entrepreneurship represents a key factor in capturing new circular business opportunities.

However, the extant academic literature has so far mainly investigated the role of established firms as valuable actors in the CE field, without focusing on green early-stage ventures and Small and Medium Enterprises (SMEs). Such firms are deemed to play a significant role in pursuing innovation in this field (Cohen and Winn, 2007; Dean and McMullen, 2007; Garud and Karnøe, 2003; Hart and Milstein, 1999; McDaniels and Robins, 2017; Owen et al., 2018; Wüstenhagen et al., 2008), but they often face financial constraints to develop and scale their business (Ghosh and Nanda, 2010; Giudici et al., 2018; Hornuf and Schwienbacher, 2018; Josefy et al., 2017) because of high levels of uncertainty characterizing their inventions and their capital-intensive nature.

Goal of the project

The overall goal of the project is, first, to develop a robust and fully replicable methodology to identify companies operating in the CE field in Europe, given the shortcomings of the existing classification methods (e.g., NACE industrial classification, EU taxonomy of sustainable investments). Secondly, we aim to analyse the enabling factors for the development of European CE firms, with a focus on EU-level and country-level targeted policies and regulations and on the different sources of financing available for these companies. Third, we aim to analyse the extent to which the implementation of policies and regulations affect the equity offer by VC funds.

The project will involve four broad research activities:

- 1) “The mapping of CE companies in Europe”: is aimed at building a complete dataset of CE companies with associated financial accounting information, patent data, and sources of financing. The geographical distribution, the evolution over time, the current size, the patenting activities, and the sources of financing of the CE sector will be analyzed.
- 2) “The EU-level and country-level targeted policies and regulations”: is aimed at collecting a comprehensive set of policies and regulations that are central to the chapter of CE of the European Green Deal (and that can be declined at both European and national level) and categorizing them along a set of dimensions.
- 3) “The enabling factors for the development of CE companies”: is aimed at exploring the effects of the implementation of CE specific and targeted policies and regulations (at both EU-level and country-level) and the effects of different sources of financing on the financial and innovative performance of CE firms.
- 4) We will explore the extent to which the implementation of policies and regulations affect the offer of equity by VCs in the CE field.

The results stemming from such research activities will lead to the definition of a set of policy recommendations.

Research methodology

From an empirical and methodological standpoint, the project will be characterized by the following specificities:

- a multi-country perspective, based on the analysis of CE firms in the main European Member States;
- a focus on the different sources of equity financing for European CE firms (i.e., business angels, VCs)
- a focus on the policies and regulations that govern the CE industry at EU-level and country-level
- the combination of different research methods (i.e., quantitative analyses, interviews with relevant actors, extensive reviews, visualization techniques)

As regards the design of the collection, structuring and analysis of data, the research fellow will work alongside the team of the Department of Management (DiSA) to integrate different unique and original data sources, such as:

- PATSTAT, which contains bibliographical patent data from leading industrialised and developing countries. The retrieved patents will be examined to improve the characterization of cleantech technologies to a finer-grain level by identifying the key technological areas through their IPC classifications and develop useful measures to assess the relative technical value of the inventions (e.g., the number of received citations), the propensity to collaborate with other external partners (e.g., the number of assignees), the technological complexity (e.g., the number of inventors) as well as other standard patent-based indicators that can be used to better characterize the innovation activities of cleantech firms (e.g., the count of backward non-patent and patent citations, the technological scope).
- THOMSON ONE, to gather data on financial transactions, is provided by Thomson Reuters and has been extensively used in the academic literature to study venture capital deals. This database

characterizes the investment of venture capital funds, private equity funds, buyouts into portfolio companies, firms, executives and limited partners. It also provides analytics on fund performance, commitments and disbursements. This database is the only VC database with extensive historical records covering years prior to the 1980s.

- EUROSTAT, to gather regional and national level data on the innovativeness and social development of different geographical contexts to capture differences within Europe.

Impact

The results of the project will have important implications for the policy that European countries and the European regulatory bodies should implement to foster the demand for VC and BA by entrepreneurial ventures investing in technologies supporting CE. Our focus on different types of investors is also extremely important as not all sources of finance may generate the same impact and different types of investors may show different investment strategies, by focusing on a limited number of technologies or by spreading their investments more evenly over a wide portfolio of technologies. Moreover, different investors should be influenced in different ways by regulations. Thus, policy makers interested in improving the transition in their countries should implement measures for attracting institutional investors, as the capital required for CE-based projects by far surpasses the available funds of SMEs.

The results of the project will enable to understand to what extent governments should strengthen the improvement and implementation of CE-specific policies and if more stringent policies using direct and indirect taxation mechanisms represent limits or opportunities for firms' growth and innovation. Finally, the project will allow to adopt an ecosystem approach to understand how different stakeholders can contribute to the development of the CE industry and formulate relevant policy guidelines. The interaction between environmental policies, firms and institutional investors is complex and might give rise to several criticalities that need to be taken into consideration and managed.

Workplan

The project is structured in four Work Packages (WP), as described below (with indication of the duration of the commitment expressed in months), and summarized in Figure 1.

WP0: Project management (months 1-12)

The research fellow will support the DiSA team in project management, for example in terms of organizing meetings with stakeholders or other PNRR project partners.

WP1: Literature analysis (months 1-2)

In this WP, the fellow will be tasked with understanding the available literature on CE innovation, entrepreneurship, entrepreneurial finance, sustainability and policy regulations.

WP2: Data collection and database creation (months 3-7)

Drawing on the various data sources described in the Research Methodology, the research fellow will carry out the data collection aimed at the empirical analysis.

WP3: Data analysis, writing and dissemination (months 6-12)

In this WP, the research fellow will collaborate with the project research group in the preparation of the following deliverables:

- A relational database containing the data collected in the project;
- A report on the mapping the policies developed in support of CE firms;
- A series of press releases, informative articles, and social media posts related to the project activities;
- Two academic papers with the main results obtained by the project;
- Organizing or attending a workshop/seminar to discuss the research results.

Figure 1 – Workplan of activities

WP/Months	1	2	3	4	5	6	7	8	9	10	11	12
WP0: Project management	■	■	■	■	■	■	■	■	■	■	■	■
WP1: Literature review	■	■										
WP2: Data gathering and database creation			■	■	■	■						
WP3: Analysis, writing and dissemination of results						■	■	■	■	■	■	■

Preferential characteristics for the selection of the research fellow

The following points describe the preferential characteristics of the research fellow for the project:

- Have experience in carrying out academic research or policy practice in the field of entrepreneurship, innovation, sustainability;
- Have experience in the management and analysis of quantitative data, with the support of datasheets (e.g. Excel) or statistical software (e.g. Stata);
- Have experience in managing and analyzing qualitative data, with the support of text files or software (e.g. Nvivo);
- Have experience designing and administering online surveys (eg through Qualtrics);
- Have at least an intermediate level of English (CEFR B2) or preferably an advanced or advanced level (CEFR C1 or C2);
- Have experience in knowing and collaborating with organizations in the field of entrepreneurship, innovation and sustainability;
- Have published reports or articles based on qualitative or quantitative research.