



RIBES

REGIONAL INCLUSIVE BIOBASED
ENTREPRENEURSHIP SOLUTIONS

DELIVERABLE 2.3

Socio-economic, psychological and behavioural drivers of social innovation

White Research

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Regional Inclusive Biobased Entrepreneurship Solutions

TABLE OF CONTENTS

EXECUTIVE SUMMARY	6
1. INTRODUCTION	9
1.1 Aim and scope of deliverable	9
1.2 Outline of deliverable	9
2. OBJECTIVES	10
3. LITERATURE REVIEW AND BACKGROUND ANALYSIS	11
3.1 Introduction to Social Entrepreneurship	11
3.2 Social Entrepreneurship Intention	12
3.3 Psychological Drivers of Social Entrepreneurship	12
3.4 Socio-Economic and Contextual Influences	13
3.5 Educational and Institutional drivers	14
3.6 Bioeconomy and Social Entrepreneurship	14
3.7 RIBES Approach	16
4. METHODOLOGY (UPDATED)	17
4.1 Survey Rationale (new)	17
4.2 Data collection (updated)	20
4.3 Measurements	23
5. SURVEY ANALYSIS	27
5.1 Key variables and statistics	27
5.2 Geographic patterns	48
5.3 Modeling	54
5.4 Key findings	56
5.5 Discussion	65
6. CONCLUSIONS	66
7. REFERENCES	68
8. ANNEX	72
8.1 Annex I – Survey Questionnaire	72
8.2 Annex II	91
8.3 Annex III – Complementary statistical analysis	98
8.4 Annex IV – Mixed Level Regression	102

LIST OF FIGURES

Figure 2: Degree of Urbanization	19
Figure 1. EU countries selected for RIBES survey.....	21
Figure 3. Distribution of SEI Item Responses.....	28
Figure 4. Distribution of SESE Item Responses.....	29
Figure 5. Distribution of SESEB Item Responses.....	30
Figure 6. Distribution of Prior Experience Item Responses	31
Figure 7. Distribution of Performance-Based Culture Item Responses	32
Figure 8. Distribution: Institutional Support Item Responses	33
Figure 9. Pearson correlation between the dependent variables and the main independent variables at the individual level.....	35
Figure 10. Pearson correlation between the dependent variables, the main independent variables and the controls at the individual level.....	36
Figure 11. Pearson correlation between the dependent variable, the main independent variables and the controls at the individual level and the regional variables	37
Figure 12. Social Entrepreneurial Intention by Region (NUTS 2 level).....	49
Figure 13. Social Entrepreneurial Self-Efficacy by Region (NUTS 2 level)	50
Figure 14. Self-Efficacy for Bioeconomy by Region (NUTS 2 level)	51
Figure 15. Prior Experience with Social Entrepreneurship (NUTS 2 level)	52
Figure 16. Regional Poverty Rate (NUTS 2 level).....	53
Figure 17. G* Power output	64
Figure 18. Power curve of sample size.....	65
Figure 19. Perceived Challenges in Social Innovation answers' distribution	92
Figure 20. Perceived Solutions to Address Challenges answers' distribution	93
Figure 21. Summary Heatmap by Age Group	99
Figure 22. Summary Heatmap by Gender Identity	99
Figure 23. Summary Heatmap by Residential Environment.....	100
Figure 24. Summary Heatmap by Education Level	100
Figure 25. Summary Heatmap by Income Group	101
Figure 26. Summary Heatmap by Religiosity	101
Figure 27. Summary Heatmap by Political Positioning.....	102
Figure 28. Summary Heatmap by Country	102

LIST OF TABLES

Table 1. Survey's questionnaire structure	22
Table 2. RIBES Key Variables.....	27
Table 3. Descriptive statistics of Social Entrepreneurial Intention (SEI)	27
Table 4. Descriptive statistics of Social Entrepreneurial Self-Efficacy (SESE)	28

Table 5. Descriptive statistics of Social Entrepreneurial Self-Efficacy for Bioeconomy (SESEB).....	29
Table 6. Descriptive statistics of Prior Experience (PE)	30
Table 7. Descriptive statistics of Performance-Based Culture (PBC)	31
Table 8. Descriptive statistics of Socially Supportive Institutional Environment (SSIE)	32
Table 9. Construct-level summary statistics and reliability scores	34
Table 10. Frequencies of participants by Country	37
Table 11. Frequencies of participants by Age Group	38
Table 12. Frequencies of participants by Residential Environment	38
Table 13. Frequencies of participants by Gender Identity.....	39
Table 14. Frequencies of participants by Income Group	39
Table 15. Frequencies of participants by Educational Background	40
Table 16. Cross-tabulation by Age Group	41
Table 17. Cross-tabulation by Gender Identity	41
Table 18. Cross-tabulation by Residential Environment	42
Table 19. Cross-tabulation by Educational Background	43
Table 20. Cross-tabulation by Income Group.....	43
Table 21. Cross-tabulation by Religiosity	44
Table 22. Cross-tabulation by Political Orientation	46
Table 23. Cross-tabulation by Country	47
Table 24. Summary statistics of the regional variables	48
Table 25. OLS Regression Results – Social Entrepreneurial intention	57
Table 26. OLS Regression Results – Social Entrepreneurial self-efficacy.....	59
Table 27. OLS Regression Results – Social Entrepreneurial self-efficacy for bioeconomy	61
Table 28. OLS Regression Results – Prior experience.....	63
Table 29. Perceived Challenges in Social Innovation	92
Table 30. Perceived Solutions to Address Challenges	93
Table 31. Age Differences in PC and PSS Scores	94
Table 32. PC and PSS Scores by Gender Identity	95
Table 33. PC and PSS Scores by Residential Environment	95
Table 34. Differences in PC and PSS by Education Level	95
Table 35. PC and PSS Scores by Annual Income Bracket.....	96
Table 36. Differences in PC and PSS by Self-Reported Religiosity	96
Table 37. Differences in PC and PSS by Political Identification	97
Table 38. Country Differences in Perceived Challenges and Support for Solutions	98
Table 39. Mixed Level Regression	103

ABBREVIATIONS

SE	Social Entrepreneurship
SEI	Social Entrepreneurship Intention

SESE	Social Entrepreneurial Self-efficacy
SESEB	Social Entrepreneurial Self-efficacy for the Bioeconomy
PE	Prior experience
PBC	Performance-Based Culture
SSIE	Socially Supportive Institutional Environment

EXECUTIVE SUMMARY

Social entrepreneurship offers a compelling approach to address complex societal challenges, combining economic sustainability with meaningful social impact. Within the framework of the RIBES project, this deliverable examines critical socio-economic, psychological, and behavioural factors influencing individuals' engagement in social entrepreneurship, particularly within contexts where technological innovation mechanisms are limited.

Drawing upon a detailed literature review and empirical data from surveys conducted in Greece, Italy, Poland, and Romania, the study identifies significant insights into the drivers of social entrepreneurship. Psychological motivators, notably self-efficacy and intrinsic motivation, emerged as powerful predictors of entrepreneurial intent, particularly among younger populations who view sustainable entrepreneurship as both a personal opportunity and an ethical responsibility.

The deliverable also reveals a robust link between regional poverty rates and the inclination toward social entrepreneurship. Data indicates that economically disadvantaged regions, especially those reliant on agriculture, display higher levels of entrepreneurial intent as communities actively seek grassroots solutions to systemic economic, environmental and social challenges. Examples from southern Italy underscore social entrepreneurship as an effective strategy for addressing local needs and fostering community resilience.

Agricultural contexts further demonstrate notable potential for social entrepreneurship through initiatives like sustainable farming, community-supported agriculture, and cooperative models. These efforts not only enhance local food security and sustainability but also stimulate inclusive economic growth.

To support and enhance social entrepreneurial activity, the deliverable suggests several strategic considerations for stakeholders. Policymakers might focus on strengthening institutional support mechanisms, such as providing accessible funding, streamlined administrative processes, and targeted mentorship programs, particularly in underserved areas. Public awareness campaigns promoting entrepreneurial values and community engagement could further encourage local innovation.

Educational institutions can significantly influence social entrepreneurship by incorporating practical, experience-based learning and mentorship opportunities into their programs, helping students develop crucial entrepreneurial skills and confidence. Additionally, fostering collaboration among local stakeholders—such as business incubators, investors, and community groups—can strengthen entrepreneurial ecosystems by enhancing resource sharing and community networks.

In conclusion, coordinated and context-sensitive strategies that recognize regional nuances and leverage local strengths are essential to supporting vibrant social entrepreneurial ecosystems. By fostering inclusive and resilient communities, stakeholders can effectively contribute to sustainable development and meaningful social transformation.

The findings of T2.3 generate key implications for WP4, WP5 and deliverable 2.5:

- WP4: Provide evidence on region-specific policy levers to shape adaptive governance frameworks.
- WP5: Highlights training and stakeholder engagement needs tailored to urban, intermediate and peripheral contexts.

- D2.5: Feeds in the forthcoming D2.5 by supplying key spatial insights and recommended instruments for downstream implementation.

1. Introduction

Social entrepreneurship represents a powerful approach for tackling complex societal challenges, offering innovative, community-focused solutions that balance economic sustainability with positive social impact. Within the broader RIBES project, which aims to foster inclusive and circular bioeconomy models across European regions, understanding the underlying factors that motivate and enable social entrepreneurship is crucial. This deliverable specifically addresses the socio-economic, psychological, and behavioural aspects that drive individuals toward social innovation, particularly in regions where technological innovation pathways may be constrained or limited.

1.1 Aim and scope of deliverable

This deliverable fulfils Task 2.3 (M1-M18) as described in the RIBES Grant Agreement. The aim of this deliverable is to thoroughly explore and understand the key factors influencing people's willingness and ability to engage in social entrepreneurship. It closely examines psychological motivators, such as self-confidence and personal values, alongside socio-economic and institutional contexts that either support or hinder social innovation. By integrating insights from a comprehensive literature review with empirical data gathered through surveys in four strategically selected European countries—Greece, Italy, Poland, and Romania—this study seeks to reveal how individual intentions, prior experiences, cultural norms, and perceived institutional support collectively shape social entrepreneurial behaviour.

The deliverable aims to contribute directly to the broader goals of the RIBES project by identifying practical levers for policy intervention, educational enhancements, and supportive ecosystem development. Through this focused exploration, the deliverable intends to provide actionable insights that can support local and regional stakeholders in promoting inclusive, sustainable, and community-driven bioeconomy solutions.

1.2 Outline of deliverable

This deliverable is structured into seven sections, each building on the previous to present a full picture of the study.

- Section 2 outlines the main objectives of the research, explaining what the study aims to investigate and how it contributes to the goals of the RIBES project. It also presents the key research questions guiding the analysis.
- Section 3 offers a literature review and background analysis. It introduces the main concepts and theories related to social entrepreneurial intention, psychological and behavioural drivers, and the role of the bioeconomy in shaping social innovation.
- Section 4 describes the methodology used in the study, including how the questionnaire was developed, the selection of countries, the sampling strategy, and how data was collected and processed. All research activities in T2.3 are governed by the Ethics and Data Protection guidelines delivered under WP6.

- Section 5 presents the findings of the survey. It includes descriptive statistics and explores correlations between key variables such as intention, self-efficacy, prior experience, and contextual factors.
- Section 6 discusses the results in relation to the research questions and literature, drawing attention to the main trends and interpretations relevant to the RIBES context.
- Section 7 concludes the deliverable by summarising the main insights and reflecting on their implications for social innovation policy, education, and regional development within the bioeconomy.

The Annex contains the full survey questionnaire and additional supporting material.

2. Objectives

The main goal of this study is to explore the socio-economic, psychological, and behavioural factors that influence people's willingness to engage in social entrepreneurship. As part of the RIBES project's broader aim to promote inclusive and circular bioeconomy models in rural and semi-rural regions, this task looks closely at what motivates individuals and shapes their capacity to take part in socially driven innovation.

Social entrepreneurship is widely recognised as a valuable approach to addressing complex societal issues, especially in areas that face economic or institutional challenges and where traditional innovation pathways may be limited. Yet, the decision to step into a socially entrepreneurial role is not automatic. It depends on a range of internal motivations and external conditions. Identifying and understanding these factors is crucial for developing policies, support systems, and educational tools that can empower people at the local level and help foster sustainable, community-based entrepreneurship.

To achieve these aims, the study was carried out in two core phases:

- **Literature Review** – A comprehensive review of behavioural, psychological, and social research was conducted to map the theoretical foundations and highlight key constructs influencing social entrepreneurial intention. This phase also informed the development of the survey instrument and provided interpretative lenses for analysing results.
- **EU Citizen Survey** – A quantitative study was conducted across four EU countries—Greece, Italy, Poland, and Romania—selected for their diversity in social entrepreneurship development and presence of [RIBES MTF networks](#). The survey captured data on individual intentions, self-efficacy, prior experience, and perceptions of cultural and institutional support, along with a wide range of socio-demographic variables at regional level.

The survey gathered a wide range of data, investigating people's **intention to engage in social entrepreneurship**, their **general and bioeconomy-specific self-confidence** to make a difference, and any **previous experience** they may have had with social or circular bioeconomy-related activities. It also examined how individuals **perceive their local culture and the institutional support** available to them, and it collected information on **socio-demographic and contextual characteristics** such as age, gender, income level, political orientation, and regional development indicators. Together, these elements allow for a layered understanding of the factors that influence social entrepreneurship.

By linking survey responses to **regional data** on poverty, innovation levels, and economic growth, the study applies a multi-level perspective. This approach not only adds depth to the analysis but also strengthens the connection between individual-level insights and regional development challenges, which are already discussed in D2.1. The findings of this work are intended to support the overall objectives of the RIBES project, especially the MTFs, by helping to identify ways to better support local actors, remove structural barriers, and foster environments where socially and environmentally conscious entrepreneurship can thrive.

To guide this investigation, the study addresses the following key research questions:

1. What individual traits and motivations influence the intention to engage in social entrepreneurship?
2. How do socio-economic and other contextual factors shape people's willingness and confidence to become social entrepreneurs?
3. What is the impact of previous experience with social or bioeconomy-related activities on current social entrepreneurial intention?

3. Literature review and background analysis

3.1 Introduction to Social Entrepreneurship

Social entrepreneurship (SE) refers to the process through which individuals or organizations identify and pursue innovative solutions to social problems, using entrepreneurial principles to create and sustain social value. Unlike traditional entrepreneurship, which prioritizes profit, SE is primarily driven by a social mission and aims to generate positive societal impact (Dees, 1998; Mair & Marti, 2006). The roots of SE lie in a growing dissatisfaction with the limitations of public and private sector mechanisms to address complex social issues such as poverty, inequality, and environmental degradation. Social entrepreneurs often act as change agents, adopting a mission to create and sustain social value through innovative practices, the pursuit of opportunity, and the use of resources beyond what is immediately available (Bornstein, 2004; Nicholls, 2006).

Research has highlighted the hybrid nature of SE, operating at the intersection of public benefit and market-based approaches. These ventures typically aim for a "double bottom line"—balancing financial sustainability with the achievement of social objectives (Austin et al., 2006; Santos, 2012). This has led to the emergence of a diverse range of organizational forms and strategies that are highly context-dependent. SE is now recognized as a critical mechanism for addressing societal challenges in both developed and developing countries (Mair & Marti, 2009; Silvestre, 2015).

SE can be found in diverse domains, including education, healthcare, environmental conservation, fair trade, and community development. What unites these varied endeavors is their focus on impact rather than income, and their responsiveness to unmet social needs. The field also encompasses different organizational structures, from non-profits and cooperatives to hybrid models and for-profit entities with strong social missions (Kerlin, 2010). These organizations often engage in partnerships with governments, private firms, and civil society to amplify their impact (Mair & Noboa, 2006).

The conceptual development of SE has evolved considerably over the past two decades. Scholars have debated whether it constitutes a distinct discipline or is a subfield within entrepreneurship. Despite differences in interpretation, there is growing consensus that SE is characterized by innovation, proactiveness, and risk-taking, coupled with a strong sense of social responsibility. As such, SE serves not only as a pragmatic solution to pressing social problems but also as a normative stance on how economic activity should align with broader societal values (Mair & Noboa, 2006; Zahra et al., 2009).

3.2 Social Entrepreneurship Intention

Social entrepreneurship intention (SEI) represents an individual's conscious mindset and willingness to establish a social venture. SEI is shaped by a combination of personal values, cognitive processes, and contextual factors. Models such as the Theory of Planned Behavior and Shapero's Entrepreneurial Event Model have been adapted to explain SEI by incorporating elements like empathy, moral obligation, and perceived self-efficacy (Ajzen, 1991; Mair & Noboa, 2006).

Motivational factors, both intrinsic (e.g. personal fulfilment, passion for social change) and prosocial (e.g. empathy, moral values), play a significant role in influencing SEI. These motivations are often rooted in early life experiences, personal encounters with social injustice, or exposure to role models who exemplify socially entrepreneurial behavior (Miller et al., 2012; Bacq & Janssen, 2011). Empirical studies show that individuals with higher levels of empathy and moral reasoning are more likely to engage in social entrepreneurial behavior (Hemingway, 2005; Forster & Grichnik, 2013). Gender also appears to moderate the relationship between motivational factors and SEI, with women often demonstrating a stronger orientation towards prosocial motivations (Lortie et al., 2017).

Furthermore, SEI is not only a matter of personal conviction but is shaped by the individual's perceived feasibility and desirability of starting a social venture. These perceptions are influenced by factors such as self-confidence, access to networks, availability of resources, and societal recognition of social entrepreneurship as a viable career path (Krueger & Brazeal, 1994; Linan & Fayolle, 2015). Policies that lower entry barriers, provide financial incentives, or recognize SE achievements can increase both perceived feasibility and desirability, thereby fostering SEI (Lepoutre et al., 2013).

Research also indicates that SEI is a dynamic construct. It can evolve over time based on changes in personal circumstances, exposure to social issues, or new opportunities for social innovation. Longitudinal studies suggest that SEI is not static but responds to external stimuli, such as crises, educational interventions, or societal shifts (Kickul et al., 2010). Thus, fostering SEI requires ongoing support mechanisms that nurture individuals' commitment and capacity to act.

3.3 Psychological Drivers of Social Entrepreneurship

Psychological factors are pivotal in explaining why individuals choose to pursue social entrepreneurship. Among the most frequently cited are empathy, moral judgment, prosocial motivation, and intrinsic motivation. Empathy allows individuals to understand and internalize the suffering of others, serving as a trigger for socially oriented actions (Goetz et al., 2010; Niezink et al., 2012). Moral judgment further strengthens the ethical imperative to act, distinguishing social entrepreneurs from their commercial counterparts (Preston et al., 2007).

Self-efficacy—the belief in one’s own ability to perform tasks and achieve goals—has been consistently linked to higher SEI. It is often developed through prior experience, exposure to social issues, or supportive environments. High self-efficacy leads to greater confidence in addressing complex challenges and sustaining entrepreneurial efforts (Bandura, 1977; Zhao et al., 2005). Furthermore, individuals with elevated self-efficacy tend to be more resilient and adaptable, traits that are essential in navigating the uncertainties of SE (Giles et al., 2004).

Another key psychological construct is social worth—the sense of being appreciated or valued by others. This communal motivation reinforces one’s commitment to a social mission by validating their efforts through social feedback. People who feel socially valued are more likely to view their contributions as meaningful and are thus more motivated to pursue social change through entrepreneurship (Mair & Noboa, 2006).

Intrinsic motivation, or the inherent satisfaction derived from engaging in an activity, also plays a crucial role. Social entrepreneurs often report high levels of personal fulfilment from helping others and achieving social impact, regardless of monetary rewards. This internal drive sustains their long-term engagement and helps them overcome resource constraints, societal scepticism, or policy barriers (Ryan & Deci, 2000).

Together, these psychological drivers create a robust internal framework that sustains the complex and often demanding journey of social entrepreneurship. They highlight the importance of cultivating not just skills but also values and affective orientations in aspiring social entrepreneurs.

3.4 Socio-Economic and Contextual Influences

Contextual factors such as socio-economic background, cultural norms, and institutional frameworks significantly shape social entrepreneurship. In developing countries, SE often emerges as a response to institutional voids and systemic inequalities. For low-income individuals, social entrepreneurship may be less about altruism and more about necessity and survival (Mair & Marti, 2009; Silvestre, 2015).

One major influence on SEI is access to social and financial capital. Individuals embedded in strong community networks or support systems are more likely to identify and pursue socially innovative opportunities. In contrast, those in marginalized contexts may lack the social scaffolding needed to transform intentions into action (Danis et al., 2011). Moreover, disparities in education, income, and gender can mediate access to the necessary resources for SE, thus affecting its prevalence and form (Bargain et al., 2017).

Cultural narratives also play a role in shaping how social entrepreneurs are perceived and how their work is legitimized. In collectivist societies, SE is often aligned with shared values of mutual support and community well-being. In contrast, individualist cultures may place greater emphasis on personal initiative and leadership, which can at times overshadow the communal dimensions of SE (Borzaga et al., 2012). As highlighted in Deliverable 2.1, these communal aspects—along with local culture—tend to play a more significant role in rural regions, where community ties and collective action are often more deeply rooted. These cultural dynamics influence the types of ventures formed and the strategies used to gain social acceptance.

Government policies and institutional quality further mediate the development of SE. Supportive policies, such as tax incentives, incubators, and dedicated funding programs, can encourage more

individuals to engage in SE. Conversely, regulatory complexity or lack of recognition for hybrid business models can deter potential entrepreneurs (Webb et al., 2013). Institutional legitimacy and public trust also play a role in determining whether social entrepreneurs can scale their impact or attract cross-sectoral partnerships (Sousa-Filho et al., 2020).

Finally, socio-economic crises, such as pandemics or natural disasters, can act as catalysts for SE. These events often expose systemic vulnerabilities and generate new needs, prompting innovative social responses. Thus, the external environment, with all its constraints and opportunities, remains a critical determinant of both the emergence and sustainability of social entrepreneurship (Erpf et al., 2019).

3.5 Educational and Institutional drivers

Education and institutional support structures are critical to nurturing social entrepreneurship. Exposure to SE through formal education, such as university courses or training programs, significantly boosts self-efficacy and SEI (Lepoutre et al., 2013). Social entrepreneurship education fosters key competencies like opportunity recognition, innovation, and ethical decision-making.

Educational institutions play a transformative role not just by imparting knowledge but also by shaping attitudes and values. Programs that incorporate experiential learning—such as field projects, social venture incubators, and community-based challenges—enable students to apply theory in real-world settings and improve positive emotions towards nature (Millenbah & Millspaugh, 2003). These experiences build confidence and foster a sense of agency, making the idea of launching a social enterprise more tangible and achievable (Forster & Grichnik, 2013).

Moreover, interdisciplinary programs that integrate insights from business, social sciences, and sustainability studies are particularly effective in preparing individuals for the multifaceted nature of SE. Educators also serve as role models and mentors, helping students navigate both the emotional and logistical aspects of becoming social entrepreneurs (Yamini et al., 2020).

Beyond formal education, informal learning environments, including workshops, boot camps, and online platforms, are also pivotal. These settings offer accessible pathways for continuous learning and community building, especially for individuals outside traditional academic systems (Hockerts, 2017).

Institutional frameworks, including legal recognition of social enterprises, funding schemes, and public policy support, further contribute to the growth of the sector. Governments and philanthropic organizations play a crucial role by creating ecosystems that support SE through grants, competitions, and partnerships (Kannampuzha & Hockerts, 2019).

Recognition mechanisms, such as awards and certification schemes, also help legitimize the field and attract new entrants. In sum, educational and institutional drivers function as both enablers and accelerators of SE. By investing in supportive infrastructure and inclusive educational models, societies can cultivate a new generation of socially conscious entrepreneurs capable of driving meaningful change.

3.6 Bioeconomy and Social Entrepreneurship

Social entrepreneurship plays a pivotal role in advancing the circular bioeconomy, which aims to transition economies from fossil-based systems to sustainable, knowledge-based, and bio-based

alternatives. Defined broadly, the bioeconomy involves the production and transformation of biological resources into value-added goods and services, with the intention of achieving both environmental sustainability and economic viability (Global Bioeconomy Summit, 2018; Devaney & Iles, 2019). In this context, entrepreneurs act as catalysts for change by identifying and exploiting opportunities within biotechnological, agricultural, and environmental innovations (Vivien et al., 2019). RIBES Deliverable 2.1 on M15, highlights that sustainability in the context of regional bioeconomies encompasses not only economic and environmental dimensions, but also social sustainability and social impact.

At the **micro-level**, individual entrepreneurs innovate by developing business models that substitute fossil-based inputs with biological resources. These ventures often aim to redesign entire value chains or introduce radically new approaches to resource utilization, such as converting biomass into bio-based products or promoting circular practices (Festel & Rittershaus, 2014; Martin, 2015). The entrepreneurial process in this space is marked by high levels of uncertainty and risk, necessitating experimentation, rapid prototyping, and iterative learning (Giurca & Späth, 2017).

At the **meso-level**, regional entrepreneurial ecosystems—comprising universities, incubators, funding bodies, and research institutions—support and enable the development of bio-based enterprises. These ecosystems facilitate collaboration, knowledge transfer, and shared infrastructure, thereby enhancing the scalability and success of bioeconomic ventures (Van Lancker et al., 2016; Borge & Bröring, 2020). Proximity to academic institutions and interdisciplinary collaboration are particularly important for translating scientific research into viable entrepreneurial solutions (Ehrenfeld & Kropfhäuser, 2017). The MTFs in the RIBES project are at this meso-level ecosystems where social enterprise and circular bioeconomy may get integrated and scaled-up.

At the **macro-level**, public policies and governmental visions provide the strategic direction and institutional support needed to advance the circular bioeconomy. National and supranational strategies often highlight entrepreneurship as a key enabler of this transformation, calling for measures such as public investment, regulatory reform, and capacity-building initiatives (European Commission, 2012; Mazzucato, 2015). Policies aimed at reducing early-stage financing gaps and supporting startup ecosystems are especially vital in overcoming market failures and accelerating innovation in bio-based sectors (Festel & Rammer, 2015).

Moreover, as also noted in Deliverable 2.1, the bioeconomy presents specific opportunities for inclusive and socially oriented entrepreneurship, particularly by promoting locally rooted solutions and leveraging regional resources to address social and environmental challenges. Rural communities, indigenous populations, and marginalized groups can benefit from bio-based activities such as ecotourism, sustainable agriculture, and traditional biomedicine, thus contributing to local development and social cohesion (Davidson-Hunt et al., 2012; Neimark, 2016).

In summary, the intersection of social entrepreneurship and circular bioeconomy represents a dynamic and multi-scalar domain that holds significant promise for addressing global sustainability challenges. By integrating innovative business models with ecological stewardship and social impact, social entrepreneurs are well-positioned to drive the systemic transformation needed for a sustainable future.

3.7 RIBES Approach

The design of the questionnaire was directly informed by the multi-dimensional framework presented in the literature review, encompassing psychological, contextual, cultural, and experiential drivers of social entrepreneurship. Each section of the survey aligns with one or more key constructs identified as influential in shaping social entrepreneurial intention and action.

The first sections of the questionnaire focused on **social entrepreneurial intention and self-efficacy**, reflecting the central role that motivation and confidence play in initiating socially driven ventures. Intention is widely regarded as a precursor to behavior, while self-efficacy captures the belief in one's capability to implement socially impactful solutions. These two components form the core of the psychological dimension explored in the review.

Recognising the importance of context-specific competence, a separate section was dedicated to **self-efficacy for the bioeconomy**. This addition acknowledges the unique challenges and opportunities posed by the circular and inclusive bioeconomy, which demands specific knowledge, adaptability, and confidence in bio-based innovation. While many studies on social entrepreneurship focus on urban settings, the RIBES project places particular emphasis on rural regions, where contextual factors, such as stronger community ties, limited access to resources, and dependence on local ecosystems, shape distinct approaches to social enterprise. These rural dynamics further underline the need for tailored competencies and self-efficacy within the bioeconomy.

To understand the influence of prior experience, a dedicated section captures **participants past exposure to social entrepreneurship and bioeconomy-related activities**. This experiential factor can significantly shape both confidence and intention, as outlined in the review.

The section on **barriers within the circular bioeconomy sector** responds to insights from the literature regarding structural and institutional constraints. By allowing respondents to identify perceived obstacles, this section helps uncover systemic issues that may hinder engagement in bio-based social innovation.

The **performance-based culture** section reflects the role of cultural norms in shaping entrepreneurial behavior. Emphasising autonomy, initiative, and risk-taking, this part gauges how societal values may either encourage or suppress social entrepreneurship.

Closely linked to this is the section on the **socially supported institutional environment**, which evaluates perceived support from public institutions, financial systems, and community structures. The literature stresses the relevance of enabling environments, particularly in regions facing institutional voids.

Lastly, **socio-demographic variables** were included to contextualise the findings and allow for analysis across different population groups. These variables support exploration of how factors such as gender, education, income, and residential setting interact with the drivers of social innovation.

Altogether, the questionnaire structure reflects a deliberate alignment with theoretical insights and empirical patterns outlined in the literature, ensuring a comprehensive assessment of the factors influencing social entrepreneurial behaviour in the context of circular bioeconomy.

4. Methodology (updated)

4.1 Survey Rationale (new)

The RIBES project operates in 10 European regions, most of which fall under **Moderate** or **Emerging** categories according to the **Innovation Index**.¹ For T2.3's large-scale citizen survey, we prioritised methodological robustness by concentrating data collection to 4 countries— 2 from the Moderate tier and 2 from the Emerging tier. The key consideration during the design of our survey was preserving the survey's statistical power: spreading a limited sample across a greater number of countries would have diluted the analytical depth and risked undermining the replicability and validity of our conclusions. Therefore, facing a methodological trade-off:

- **Either** collect limited data from many countries (reducing analytical depth),
- **Or** focus on a smaller number of strategically selected, representative countries, ensuring strong, high-quality results.

Specifically, our sample of approximately 3,200 individuals provides the statistical power needed (95%) to detect even small effects (see Section 5.4.5, Sample and Power), thereby minimising the likelihood that findings are driven by random variation.

The sample covers 4 European countries and includes respondents from 1,040 different towns and cities, ensuring a wide geographical and contextual diversity.² In line with Bamberger et al. (2004), who emphasise adapting evaluation designs under resource constraints, we prioritise methodological robustness over geographic breadth. Considering that WP2 foreseen activities aimed to provide insightful data and results from the 10 RIBES local contexts, through quantitative (T2.2) and qualitative approaches (T2.4), this specific task adopts a focused approach safeguarding the survey's statistical reliability. We concentrated resources to examine 4 countries in greater depth— selected to represent diverse European contexts spanning Southern, Western, and Northern Europe. These countries encompass a broad range of socioeconomic, cultural, and institutional environments, and therefore, hold significant potential for representativeness at a wider geographical level, both at project and European level. Also accounting for the available budget, focusing on 4 countries allowed us to acquire higher sample size in each country and thus increase statistical power in each country. In contrast with exit polls studies aiming for broad representation— findings are based on percentages of a general

¹ <https://projects.research-and-innovation.ec.europa.eu/en/statistics/performance-indicators/european-innovation-scoreboard/eis#/eis>

² Our data preparation ensures that there are no inconsistencies in city names, such as "Milan" versus "Milano". To achieve this, we applied geocoding in Python using the Nominatim service from OpenStreetMap (OSM), which converts place names into geographic coordinates.

population— in correlational studies, as our survey, one seeks reproducibility, robustness and replicability of the results, as the findings are based on linear associations between the measured instruments of the study.

The latest developments in designing a correlational study in social sciences corroborate the importance of prioritizing increased statistical power— as this increases reproducibility, robustness and replicability of the results (Nosek et al 2020). This in turn enables researchers to be more confident that findings are stable at country level, while also allowing a more reliable comparison of these robust findings across countries. By acquiring samples from more countries, the sample size in each country is reduced— making results more unstable and less replicable at country level, in turn decreasing the reliability of inter-regions comparisons. Furthermore, comparable studies in social entrepreneurship research have successfully used similar focused yet multi-country designs: for example, Angelidou and Mora (2019) analyse 6 European cities, while Wevers et al. (2024) focus on the Euroregion of Luxembourg. These examples demonstrate that meaningful and generalisable insights can be produced from carefully structured multi-country samples when analytical rigour and contextual diversity are ensured.

For each dependent variable, we estimate two complementary Ordinary Least Squares regression models: one at the individual level and one at the regional level.³ The individual level model includes town fixed effects (1,039 town dummies) to isolate the effects of individual-level variables and to control for unobserved spatial heterogeneity at the town level.⁴ Thus, the identified effects are valid across a broad range of local contexts. The regional-level model includes country fixed effects and regional controls, further accounting for national-level institutional and cultural differences.^{5,6} By statistically controlling for country effects, we isolate the core relationships relevant to social entrepreneurial intentions, reducing confounding influences tied to nation-specific factors. Together,

³ **OLS (Ordinary Least Squares) regression** is a statistical method that finds the best-fitting straight line through a set of data points by minimizing the sum of the squared differences between the observed and predicted values. It is a cornerstone of linear regression, used to estimate the relationship between a dependent variable and one or more independent variables by finding the coefficients of the linear equation that best fits the data.

⁴ A **town fixed effect (town dummies)** is a statistical technique that controls for unobservable, time-invariant characteristics that are specific to each city, such as geography or local culture.

⁵ A **country fixed effect** is a statistical technique used in regression analysis to control for unobserved, time-invariant characteristics of a country that might influence the outcome variable. It accounts for factors that are constant over time within a country, such as culture, geography, or legal systems, by estimating a unique effect for each country. This method helps to isolate the effect of other variables by removing the influence of these country-specific, constant factors, which allows for a more accurate analysis of the relationships between variables.

⁶ We collect additional variables at the **regional level (NUTS 2)** such as poverty rate and population to complement the survey data and to enrich our analysis.

these models enhance the robustness and external validity of our findings across diverse European settings.

This analytical framework ensures that socio-demographic, personality, and individual differences factors are examined independently of geographical variations. As these factors lie at the core of T2.3, this approach allows us to derive results that are representative and generalisable within the European context.

The strategy ensures the capturing of variation in innovation capacity, and variation between rural and more urban and metropolitan regions, which allows to identify the impact of contextual differences on social entrepreneurship intention. Figure 1 explores the degree of urbanization for each of the selected countries based on the Census 2021 grid dataset from Eurostat.⁷

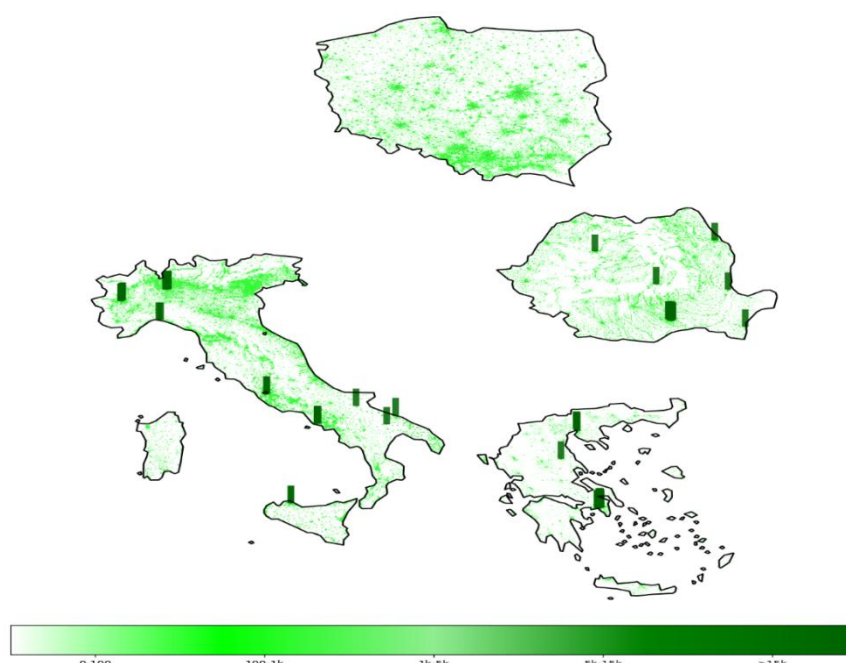


Figure 1: Degree of Urbanization

To explore the spatial dimension of urbanization, we use a raster file representing total population at a 1 km² resolution, enabling flexible, cross-border comparisons. According to the map's color scale, white areas indicate low population density, gradually shifting to green for more densely populated regions. Notably, dark green spikes represent areas with populations exceeding 15,000, highlighting urban hotspots. The illustration reveals that Greece exhibits a particularly high level of urbanization, with three major population spikes, while the rest of the country remains largely white, indicating sparse population distribution. Poland presents a different pattern, with no pronounced spikes, suggesting a more even population spread across the country. Italy and Romania fall somewhere in between: Italy

⁷ Source: <https://ec.europa.eu/eurostat/web/gisco/geodata/population-distribution/population-grids>

shows a strong concentration of population in the northern and central regions compared to the less populated south, whereas Romania combines several spikes with a generally mid-green background, indicating moderate urban concentration. These four countries capture a broad spectrum of urbanisation patterns, and each also contains marked internal contrasts between densely populated, economically active areas and regions that lag behind.⁸ Overall, the four selected countries provide sufficient **internal diversity** and **comparative value**, allowing us to generalize findings to non-surveyed regions.

The strategic selection of diverse contexts, the large and geographically dispersed sample, and the robust analytical framework ensure that the findings remain representative and impactful at the RIBES regional level, aligning with the project's objectives of generating transferable insights and widely applicable findings.

4.2 Data collection (updated)

4.2.1 Sample (updated)

After conducting comprehensive literature research, WR developed a questionnaire aimed at understanding the psychological, experiential, cultural and institutional drivers of social entrepreneurship. The survey aimed at collecting 3,200 responses from the general public across 4 countries.⁹

⁸ Jorge De La Roca, Diego Puga, Learning by Working in Big Cities, The Review of Economic Studies, Volume 84, Issue 1, January 2017, Pages 106–142, <https://doi.org/10.1093/restud/rdw031>

⁹ The survey was drafted in SurveyMonkey and conducted through a panel data company (Dynata)

- Greece
- Italy
- Romania
- Poland

The final questionnaire was translated into the native languages of the target countries to maximize accessibility and ensure the collection of at least 800 responses per country. Also, before launching the full survey, the final questionnaire underwent pre-testing with a smaller group of participants to ensure the reliability and validity of the questions. This step allowed to identify potential issues and allowed for adjustments before the launch of the survey.

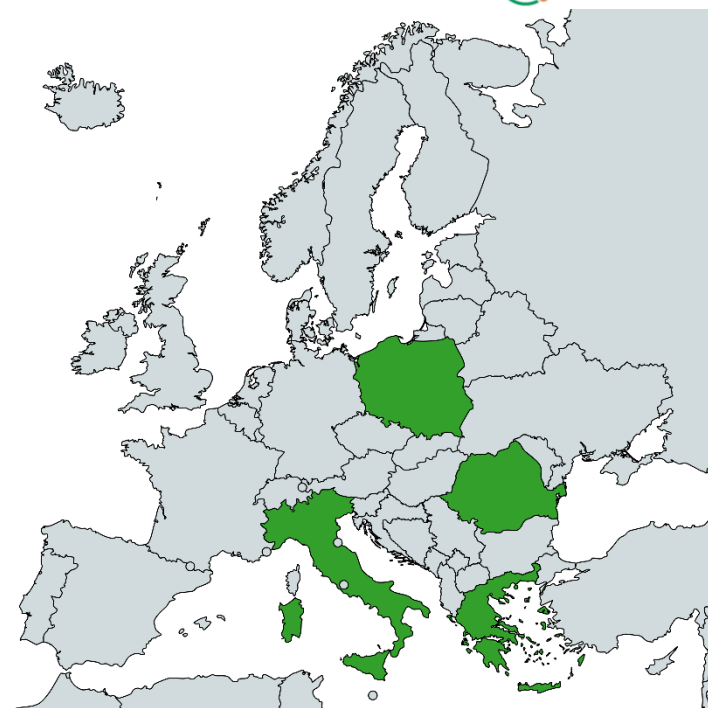


Figure 2. EU countries selected for RIBES survey

While the initial sample consisted of 3,200 respondents (800 per country), some adjustments were required during the data cleaning process. A small number of participants were removed from the analytical sample due to missing responses on key variables essential for subsequent analyses, or because they did not pass the embedded attention-check question. Furthermore, several respondents did not provide answers to critical sociodemographic items such as age, gender, or region of residence.

As a result, the final sample size may differ slightly across various summary statistics and analyses, reflecting item-level nonresponse. This means that, for certain variables, the number of valid observations is somewhat lower than the total initial sample. Such variation is a common feature of large-scale surveys and is transparently reported in all relevant tables and figures throughout this deliverable.

4.2.2 Questionnaire Structure

The survey (Table 1) consisted of a total of 49 multiple-choice questions (including the consent and attention-check items), covering a wide range of behavioural constructs, as well as socio-demographic factors. The consent forms and recruitment procedures followed the GDPR compliant protocols, set in WP6. The questionnaire was designed to capture the psychological, experiential, cultural, and institutional drivers of social innovation. The dependent variables utilised in the present research were:

- **Social entrepreneurial intention** – the respondent's intention to create a venture with a primary social mission.
- **Social entrepreneurial self-efficacy** – the individual's belief in their ability to address societal challenges through entrepreneurial action.
- **Social entrepreneurial self-efficacy for bioeconomy** – a context-specific variant measuring confidence in addressing challenges within the inclusive and circular bioeconomy.

- **Prior experience (with social entrepreneurship)** – practical involvement or exposure to social entrepreneurship and circular bioeconomy activities.

To ensure response validity, the survey also included an attention-check question. This question instructed respondents to choose a specific answer ("orange juice") regardless of their actual preference, based on a preceding statement. The purpose of this item was to identify inattentive or random responders. Participants who failed this attention check were flagged for additional inspection during data cleaning. The full questionnaire used in the survey is available in Annex – Section 8.1.

Table 1. Survey's questionnaire structure

Section	Scope
Social entrepreneurial intention	Measures respondents' willingness and planned engagement in launching ventures aimed at addressing social problems
Social entrepreneurial self-efficacy	Assesses confidence in one's own ability to create positive social impact through entrepreneurial actions.
Social entrepreneurial self-efficacy for bioeconomy	Captures self-efficacy specific to the bioeconomy domain, including circular and inclusive business models.
Prior experience (with social entrepreneurship)	Measures respondents' past exposure to social problems, organisations, and experience in the bioeconomy sector.
Barriers within the Circular Bioeconomy Sector	Binary checklist format exploring perceived structural, institutional, and community-level obstacles to social innovation in bio-based sectors.
Performance – based culture	Measures cultural norms around autonomy, initiative, and entrepreneurial risk-taking within respondents' communities.
Socially supported institutional environment	Evaluates perceptions of local and institutional support (e.g., government, banks, community groups) for starting new ventures.
Socio-demographics	Includes age, gender, education, income, ethnicity, religiosity, political orientation, and residential environment to contextualise responses.

All demographic information was collected in compliance with the general data protection regulation (GDPR) of the European Union and was used solely for research and statistical reasons. No natural person can be identified through their demographic information. In addition, to take part in the survey,

all research subjects had to agree to the terms and conditions set out to a dedicated consent form that was included in the online survey session. The obtained data were collected, processed and archived in line with WP6 GDPR procedures.

4.3 Measurements

4.3.1 Personal Characteristics

Social entrepreneurial intention

Social entrepreneurial intention was measured to capture respondents' commitment to creating ventures that address social challenges rather than prioritising financial gain. This construct reflects an individual's deliberate plan or desire to engage in social entrepreneurship, as theorised by Mair and Noboa (2006) and further operationalised by Hockerts (2017). Participants were presented with three statements adapted from Hockerts (2017) and asked to indicate their level of agreement using a five-point Likert scale ranging from "strongly disagree" to "strongly agree." An example statement was: *"I expect that at some point in the future I will be involved in launching an organisation that aims to solve social problems"*. Higher scores on this scale indicate a stronger intention to pursue social entrepreneurship. The third statement was reverse coded to reflect a lack of intention, and its score was inverted during analysis to align with the direction of the other items. Previous studies employing this measure have demonstrated acceptable reliability, with reported Cronbach's alpha coefficients exceeding 0.70 (Hockerts, 2017).

Social entrepreneurial self-efficacy

Social entrepreneurial self-efficacy refers to an individual's belief in their capacity to address social challenges through entrepreneurial action (Hockerts, 2017). It encompasses confidence in one's ability to identify opportunities, mobilise resources, and implement solutions for social problems. This construct was measured using three items drawn from Hockerts (2017), with respondents rating their agreement on the same five-point Likert scale (from "strongly disagree" to "strongly agree"). For example, participants rated their agreement with the statement: *"I am convinced that I personally can make a contribution to address societal challenges if I put my mind to it"*. Higher scores reflect greater perceived self-efficacy in contributing to social change.

Social entrepreneurial self-efficacy for bioeconomy

To account for the specific context of the circular bioeconomy, we adapted the self-efficacy construct to create a domain-specific measure of social entrepreneurial self-efficacy for the bioeconomy. This construct assesses an individual's confidence in their ability to develop solutions within the inclusive and circular bioeconomy sector. The scale followed the structure of the general self-efficacy measure (a five-point Likert scale from "strongly disagree" to "strongly agree"), but framed statements in relation to the bioeconomy. Participants were asked to rate their agreement with three statements, such as: *"I am convinced that I personally can make a contribution to address inclusive and circular bioeconomy challenges if I put my mind to it"*.

Prior experience (with social entrepreneurship)

Prior experience, defined as respondents' practical exposure to activities related to social entrepreneurship and the bioeconomy, was also assessed. This construct recognises that prior involvement can influence both capability and intention to engage in social entrepreneurship (Hockerts, 2015). It was measured using four items: three adapted from Hockerts (2015), focusing on experience with social organisations and issues, and an additional item specifically developed for this study to capture experience in the bioeconomy sector. Participants rated their agreement on a five-point Likert scale (from "strongly disagree" to "strongly agree") with statements such as: *"I have volunteered or otherwise worked with social organisations"* and *"I have experience in the bioeconomy sector"*. Higher scores reflect a broader base of prior relevant experience.

Barriers within the Circular Bioeconomy Sector

In addition to individual intentions and capacities, the survey explored respondents' perceptions of barriers within the circular bioeconomy sector. This construct refers to perceived institutional, structural, and community-level obstacles that hinder the development of social innovation in bio-based circular economies (Hermans et al., 2019; Ramcilovic-Suominen & Pülzl, 2018).

Measurement was conducted through two checklist-style questions. First, respondents were presented with a list of potential challenges (e.g., lack of funding, insufficient policy support, low awareness) and asked to indicate "yes" or "no" for each. Second, they responded "yes" or "no" to a corresponding list of proposed solutions designed to address these challenges, including interventions such as more training opportunities, improved policy incentives, or greater collaboration between stakeholders. Each item was analysed as a binary variable, facilitating identification of the most widely perceived barriers and solutions. The lists of challenges and solutions were informed by prior research on barriers to social innovation and bioeconomy transitions (Hermans et al., 2019; Ramcilovic-Suominen & Pülzl, 2018) and refined through expert input to reflect the realities of low-innovation regions targeted by the RIBES project.

More information about these constructs, along with a full descriptive and subgroup analysis, can be found in Annex II – Section 8.2.

Performance – based culture

Under performance-based culture we assessed the extent to which respondents perceive their community as promoting individual achievement, autonomy, and innovation (Hopp & Stephan, 2012). It was measured using five items from Hopp and Stephan's (2012) validated scale, with participants rating their agreement on a five-point Likert scale (from "strongly disagree" to "strongly agree"). Statements included: *"The social norms and culture of your community encourage entrepreneurial risk-taking"* and *"The social norms and culture of your community emphasise self-sufficiency, autonomy and personal initiative"*. Higher scores indicate a stronger performance-based cultural orientation.

Socially supported institutional environment

Finally, with socially supportive institutional environment, we measured perceptions of institutional support for entrepreneurship from local government, financial institutions, and community groups (Hopp & Stephan, 2012). This construct was assessed with three items adapted from Hopp and Stephan

(2012), using the same five-point Likert response format. Participants rated their agreement with statements such as: *“State and local governments in your community provide good support for those starting new businesses”* and *“Community groups provide good support for those starting new businesses”*. Higher scores indicate a greater perception of institutional support for entrepreneurial activity.

4.3.2 Socio-demographics

In addition to the psychological and environmental factors described above, the survey collected standard socio-demographic information to contextualise respondents’ backgrounds and facilitate subgroup analyses. **Country of residence** was recorded as an open-ended response, while **age** was reported in years. Participants identified their **living environment** by selecting among “urban,” “semi-urban,” or “rural” categories. **Gender identity** was reported via multiple-choice options including “male,” “female,” “non-binary,” and “prefer not to say.”

Educational attainment was measured by asking respondents to indicate their highest completed level of education, choosing from categories ranging from “did not complete high school” to “advanced graduate work or Ph.D.” **Socio-economic status** was assessed via a measure of current net annual household income. **Ethnic identity** was captured with a binary question asking whether respondents felt they belonged to the same ethnic group as most people in their region. **Religiousness** was measured on an 11-point self-rating scale (0 = “not at all religious” to 10 = “very religious”), adapted from the European Social Survey (ESS), with additional options to decline answering. Finally, **political orientation** was assessed by asking respondents to place themselves on a left–right scale ranging from 0 (“left”) to 10 (“right”), also based on standard ESS measures, with options to select “prefer not to answer” or “don’t know.”

All socio-demographic variables were either recorded as categorical or continuous measures as appropriate. They were drawn as standard formats from prior large-scale surveys (e.g., the European Social Survey for religion and politics) to ensure clarity and comparability.

4.3.3 Regional characteristics

For our regional-level variables, we primarily rely on data from Eurostat. Specifically, we utilize indicators at the NUTS 2 level, including total population, the growth of the regional gross domestic product adjusted for purchasing power standards (PPS), and the at-risk-of-poverty rate. Since we already control for individual-level personal income, we also included regional GDP growth to account for broader economic development at the regional level. In addition, we incorporate patent data sourced from the OECD’s raw patent data based on the EPO PATSTAT database to proxy for the level of technology in each NUTS 2 level. We use the most recent release of the dataset, published in Spring 2024, and specifically draw on the “EPO_INV_REG” dataset included in the January 2024 edition of the OECD REGPAT database.

Poverty rate

The at-risk-of-poverty rate by NUTS 2 region is the full definition of the poverty rate according to Eurostat.¹⁰ This indicator is derived from data collected through the European Union Statistics on Income and Living Conditions (EU-SILC). To ensure comparability both across regions and over time, Eurostat applies an ex-ante output harmonization strategy within EU-SILC, standardizing definitions and methodologies across all participating countries.

Population

Population on 1 January should be based on concept of usual resident population, i.e. the number of inhabitants of a given area on 1 January of the year in question (or, in some cases, on 31 December of the previous year).¹¹ The population figures can be based on data from the most recent census adjusted by the components of population change produced since the last census or based on population registers. The variable has been standardized to ensure geographic and time comparability by Eurostat.

Gross domestic product

Regional gross domestic product (million PPS) by NUTS 2 region.¹² The conversion to purchasing power standards (PPS) is based on national purchasing power parities (PPP) which are also regularly calculated and released by Eurostat. The variable has been standardized to ensure geographic and time comparability by Eurostat.

Technology

Technology is based on the number of patents provided by The OECD REGPAT database (2024).¹³ REGPAT allows patent data to be used in connection with other regional data such as GDP or labour force statistics, and other patent-based information such as citations, technical fields and patent holder's characteristics (industry, university, etc.), thus providing researchers with the means to develop a rich set of new indicators and undertake a broad range of analyses to address issues relating to the regional dimension of innovation.

Area

Area is calculated in QGIS in square meters using the most recent Eurostat shapefile available (2024).¹⁴

¹⁰ Source: https://ec.europa.eu/eurostat/databrowser/view/ilc_li41__custom_16338793/default/table

¹¹ Source: https://ec.europa.eu/eurostat/databrowser/view/DEMO_R_D2JAN/default/table

¹² Source: https://ec.europa.eu/eurostat/databrowser/view/nama_10r_2gdp__custom_16298598/default/table

¹³ Source: <https://www.oecd.org/en/data/datasets/intellectual-property-statistics.html>

¹⁴ QGIS is a geographic information system (GIS) software. It supports viewing, editing, printing, and analysis of geospatial data in a range of data formats.

5. Survey analysis

5.1 Key variables and statistics

This subsection presents the descriptive analysis of the main key variables measured in the survey, focusing on participants' social entrepreneurial intentions, perceived self-efficacy, and prior experience, along with perceptions of their cultural and institutional environments, utilized as independent variables. The results may offer valuable insights into the underlying drivers of social innovation across European regions.

Table 2. RIBES Key Variables

Key variable	Coding
Social entrepreneurial intention	SEI
Social entrepreneurial self-efficacy	SESE
Social entrepreneurial self-efficacy for bioeconomy	SESEB
Prior experience (with social entrepreneurship)	PE
Performance – based culture	PBC
Socially supported institutional environment	SSIE
Socio-demographics	-

Social Entrepreneurial Intention (SEI) reflects participants' anticipated involvement in launching social enterprises aimed at addressing social problems (Table 3). Overall, respondents reported moderate levels of intention, with mean scores ranging from 2.69 to 3.17 on a five-point scale and medians at 3. The highest mean was observed for general future expectation (3.04), followed by the intention to act on a preliminary idea (2.69), while the reverse-coded item on not planning to start a social enterprise had a slightly higher mean (3.17), indicating mixed levels of commitment across the sample.

Table 3. Descriptive statistics of Social Entrepreneurial Intention (SEI)

Variable	Question	Mean	Median	SD
SEI_1	I expect that at some point in the future I will be involved in launching an organization that aims to solve social problems	3.04	3.00	1.26
SEI_2	I have a preliminary idea for a social enterprise on which I plan to act in the future	2.69	3.00	1.25

SEI_3	I do not plan to start a social enterprise	3.17	3.00	1.39
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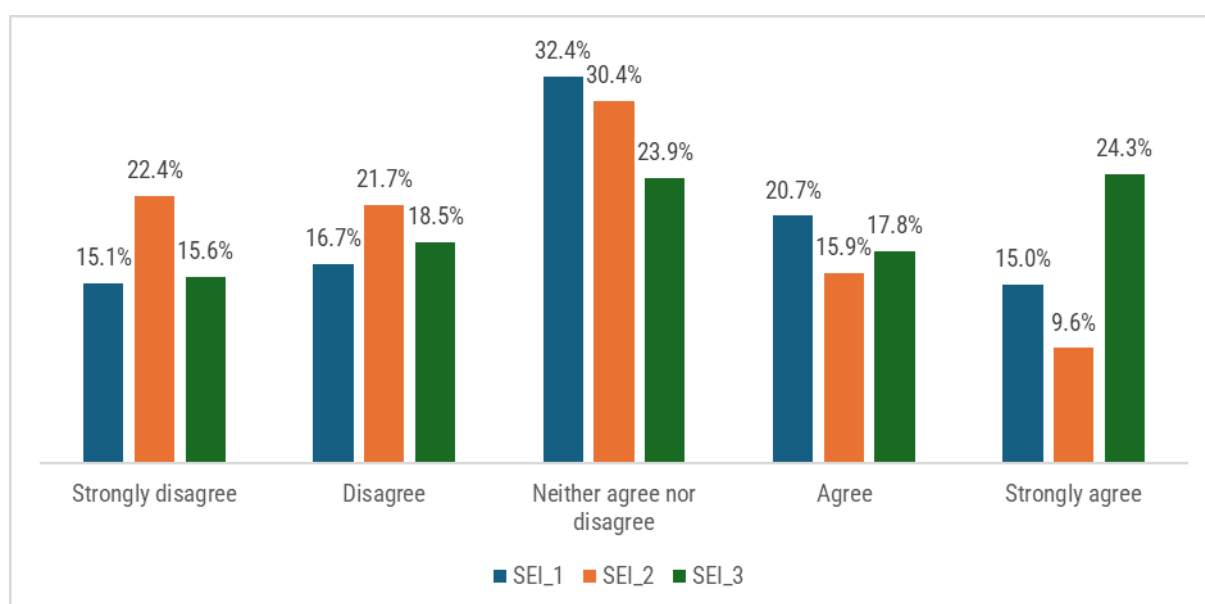


Figure 3. Distribution of SEI Item Responses

Social Entrepreneurial Self-efficacy (SESE) captures individuals' confidence in their ability to address societal challenges. The results (Table 4) suggest a strong collective sense of efficacy, with mean scores between 3.26 and 4.07 and medians at 3 or 4. Notably, the belief that everyone can contribute to solving societal problems emerged as the most endorsed item (mean = 4.07), highlighting a broadly shared sense of social responsibility.

Table 4. Descriptive statistics of Social Entrepreneurial Self-Efficacy (SESE)

VARIABLE	Question	Mean	Median	SD
SESE_1	I am convinced that I personally can make a contribution to address societal challenges if I put my mind to it	3.64	4	1.10
SESE_2	I could figure out a way to help solve the problems that society faces	3.26	3	1.13
SESE_3	Solving societal problems is something each of us can contribute to	4.07	4	0.98

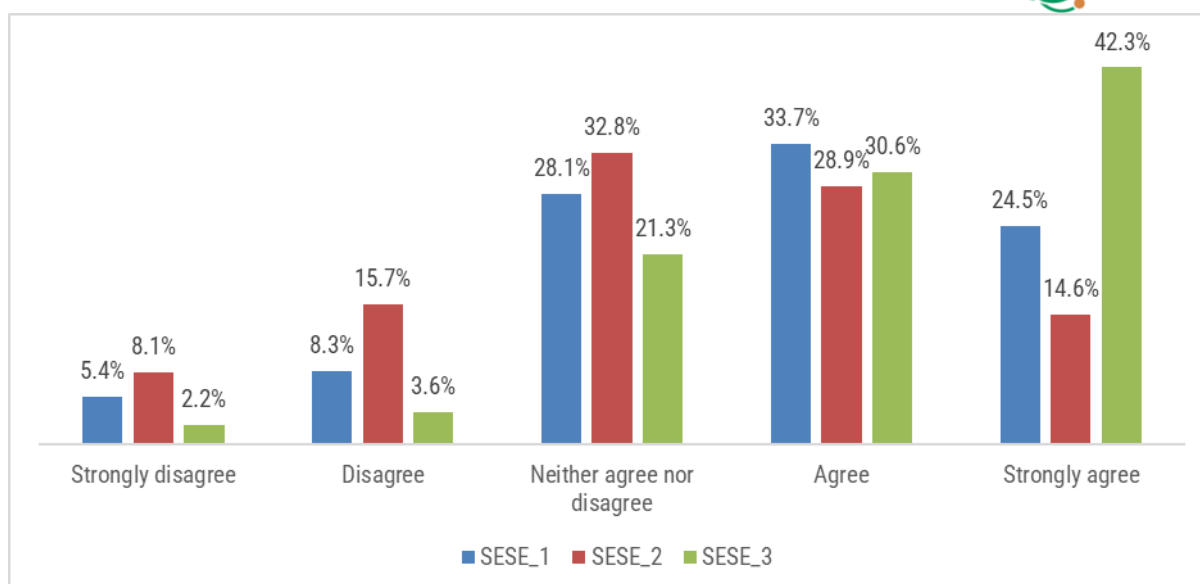


Figure 4. Distribution of SESE Item Responses

Social Entrepreneurial Self-efficacy for the Bioeconomy (SESEB) specifically measures confidence in contributing to the inclusive and circular bioeconomy (Table 5). Respondents reported moderate-to-high levels of bioeconomy-specific efficacy, with means between 3.11 and 3.71 and medians at 3 or 4. As in general self-efficacy, the collective belief in joint contributions to circular bioeconomy solutions received the strongest endorsement (mean = 3.71), suggesting an alignment between general and sector-specific efficacy beliefs.

Table 5. Descriptive statistics of Social Entrepreneurial Self-Efficacy for Bioeconomy (SESEB)

VARIABLE	Question	Mean	Median	SD
SESEB_1	I am convinced that I personally can make a contribution to address inclusive and circular bioeconomy challenges if I put my mind to it	3.41	3	1.13
SESEB_2	I could figure out a way to help solve the inclusive and circular bioeconomy problems that society faces	3.11	3	1.16
SESEB_3	Solving the inclusive and circular bioeconomy problems is something each of us can contribute to	3.71	4	1.09

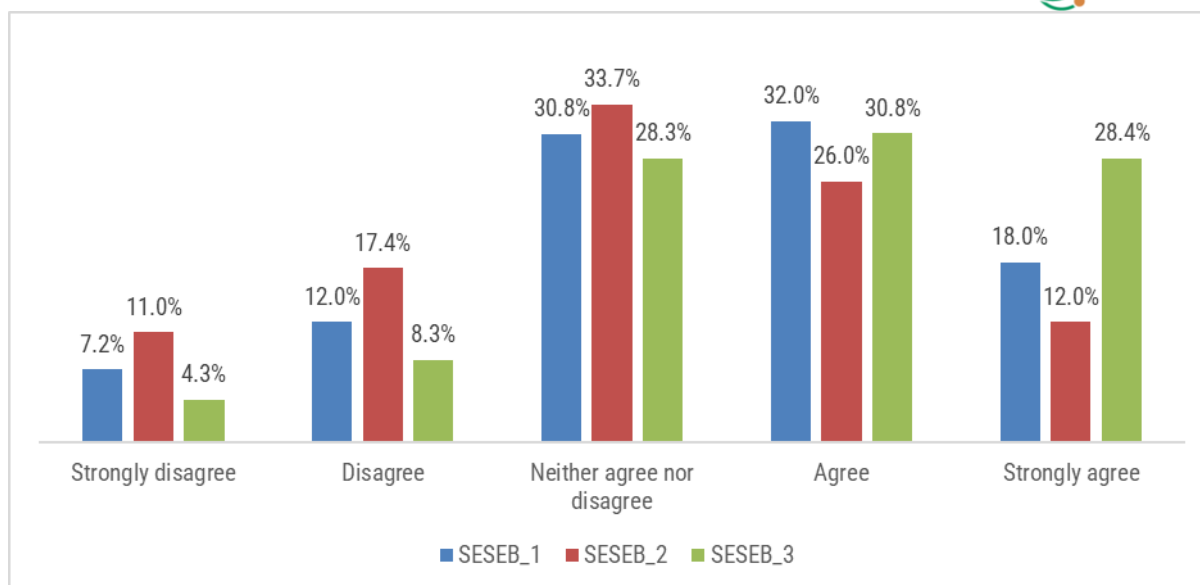


Figure 5. Distribution of SESEB Item Responses

Prior Experience (PE) assesses participants' previous involvement with social and circular bioeconomy-related activities (Table 6). While respondents showed some experience with social problems and organisations (means ~2.77–2.89), experience in the circular bioeconomy sector was notably lower (mean = 2.25; median = 2), pointing to a gap between general social engagement and sector-specific exposure that may influence readiness for bio-based entrepreneurship.

Table 6. Descriptive statistics of Prior Experience (PE)

VARIABLE	Question	Mean	Median	SD
PE_1	I have some experience working with social problems	2.79	3	1.25
PE_2	I have volunteered or otherwise worked with social organizations	2.77	3	1.45
PE_3	I know a lot about social organizations	2.89	3	1.19
PE_4	I have experience in the bioeconomy sector	2.25	2	1.21

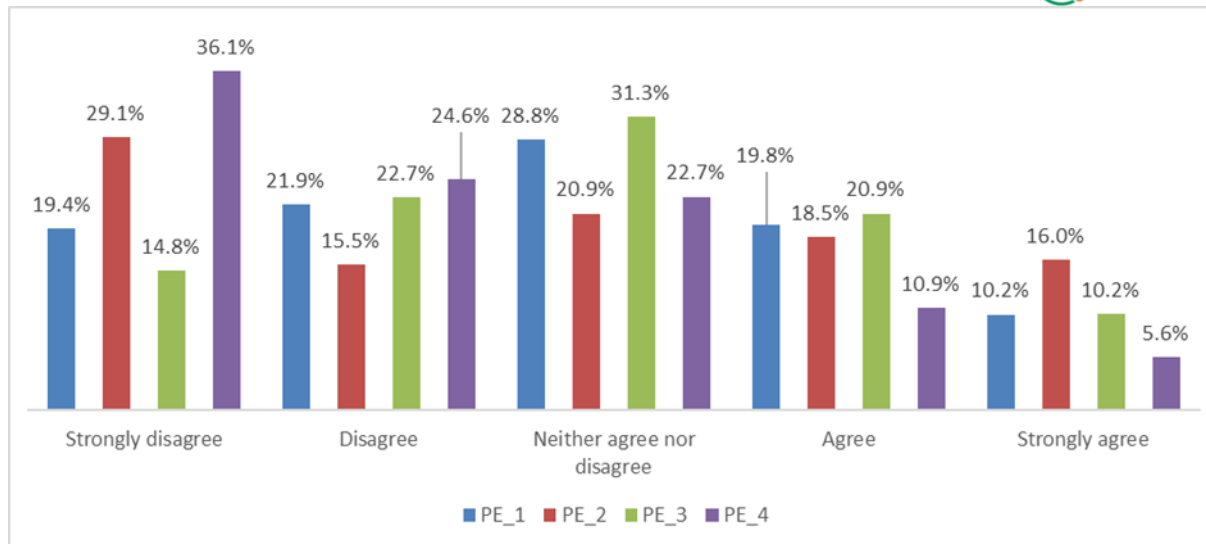


Figure 6. Distribution of Prior Experience Item Responses

Performance-based Culture (PBC) assessed perceptions of local social norms related to autonomy, risk-taking, creativity, and responsibility (Table 7). Respondents perceived moderate-to-strong cultural support for personal effort, initiative, and innovation, with means between 3.15 and 3.54 and medians mostly at 3 or 4. The strongest endorsement was for the belief that individuals are responsible for managing their own lives (mean = 3.54), highlighting a cultural emphasis on self-determination.

Table 7. Descriptive statistics of Performance-Based Culture (PBC)

VARIABLE	Question	Mean	Median	SD
PBC_1	The social norms and culture of the community where you live are highly supportive of success achieved through one's own personal efforts	3.47	3	1.04
PBC_2	The social norms and culture of your community emphasize self-sufficiency, autonomy and personal initiative	3.38	3	1.03
PBC_3	The social norms and culture of your community encourage entrepreneurial risk-taking	3.15	3	1.11
PBC_4	The social norms and culture of your community encourage creativity and innovativeness	3.32	3	1.09
PBC_5	The social norms and culture of your community emphasize the responsibility that the individual has in managing his or her own life	3.54	4	1.03

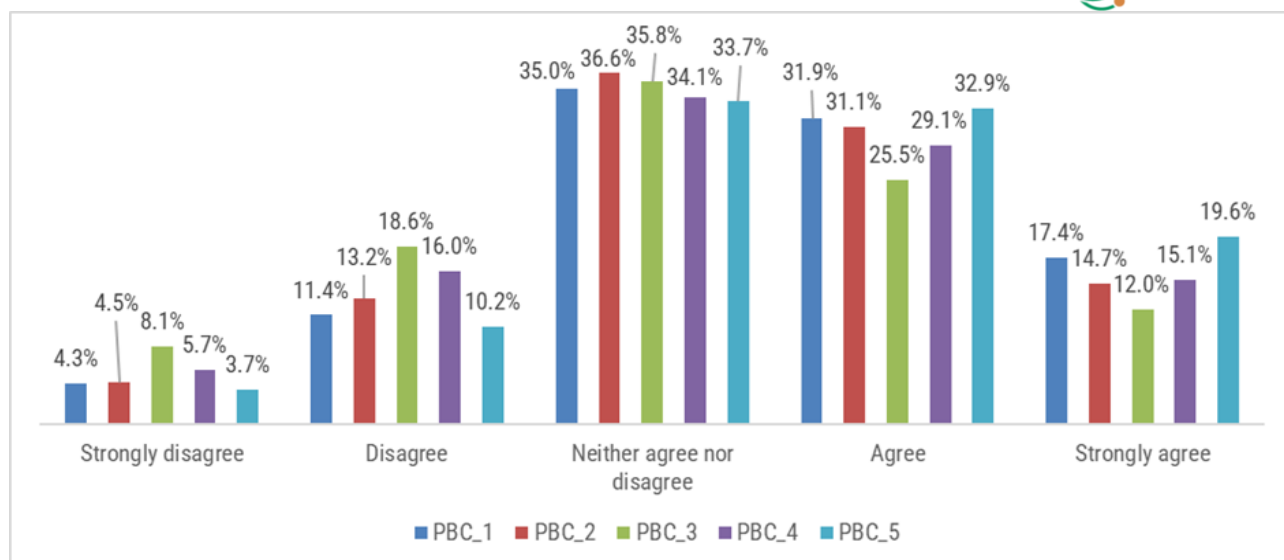


Figure 7. Distribution of Performance-Based Culture Item Responses

Socially Supportive Institutional Environment (SSIE) examines perceptions of governmental, financial, and community support for entrepreneurship (Table 8). This dimension recorded the lowest overall scores across the measured constructs, with means between 2.62 and 2.89 and medians at 3. Respondents rated state and local government support at a mean of 2.73 and investors' support at 2.62, suggesting perceived gaps in the institutional support landscape for entrepreneurship.

Table 8. Descriptive statistics of Socially Supportive Institutional Environment (SSIE)

VARIABLE	Question	Mean	Median	SD
SSIE_1	State and local governments in your community provide good support for those starting new businesses	2.73	3	1.19
SSIE_2	Bankers and other investors in your community go out of their way to help new businesses get started	2.62	3	1.18
SSIE_3	Community groups provide good support for those starting new businesses	2.89	3	1.11

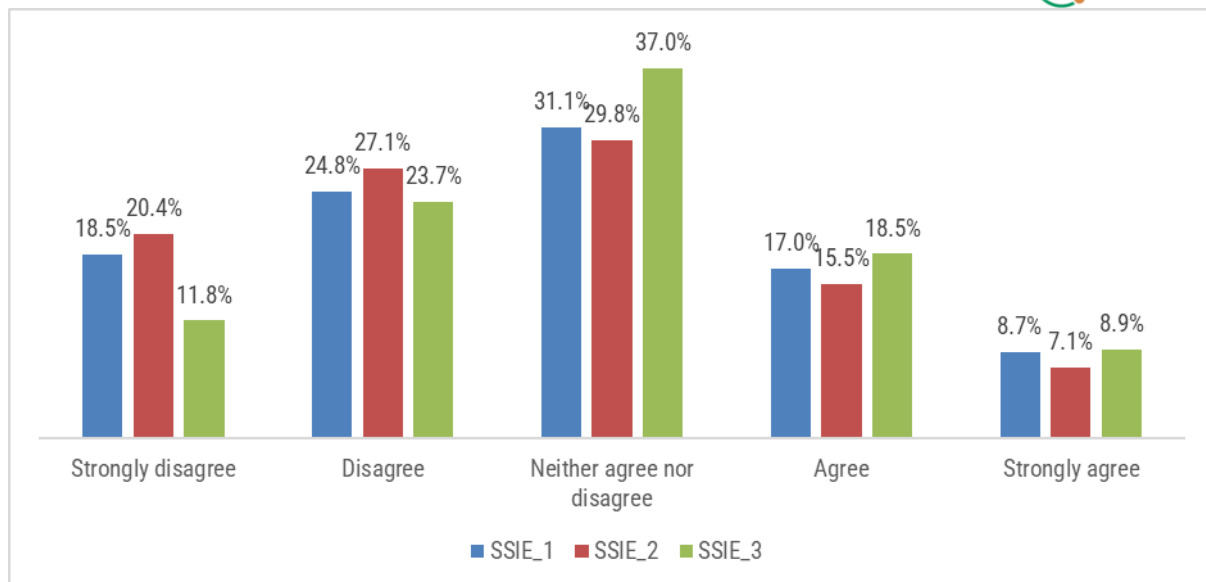


Figure 8. Distribution: Institutional Support Item Responses

These findings provide a detailed understanding of the psychological, experiential, and contextual factors shaping social entrepreneurial potential across European regions. While respondents generally reported confidence in their own capacity to address societal and circular bioeconomy challenges, this was often accompanied by limited practical experience and perceptions of insufficient institutional support. The results highlight important leverage points for policymakers, educators, and ecosystem actors aiming to strengthen the foundations for social innovation—particularly by closing gaps between intention and action, enhancing sector-specific capacity, and improving the enabling environment at the community and institutional levels.

5.1.1 Construct-level description and reliability

To provide an aggregated view of the key dimensions measured in the survey, the individual items were combined into construct-level scores (Table 9), as discussed in Section 4.2. This section summarises the descriptive statistics and internal consistency of these composite measures.

The **Social Entrepreneurial Intention (SEI)** construct, combining three items, showed a mean score of 8.56 (SD = 3.14) on a possible range of 3 to 15, with a median of 9. This indicates a moderate level of intention across the sample. The distribution was approximately symmetric (skewness = -0.0943), and the construct demonstrated good internal consistency, with Cronbach's $\alpha = 0.73$.

Social Entrepreneurial Self-efficacy (SESE), capturing confidence in addressing societal challenges, had a mean of 11 (SD = 2.72) out of 15, with a median of 11. The distribution showed moderate negative skewness (-0.559), suggesting that many respondents reported relatively high self-efficacy. The scale showed strong reliability ($\alpha = 0.80$).

Social Entrepreneurial Self-efficacy for the Bioeconomy (SESEB) had a mean score of 10.2 (SD = 2.95), with a median of 10, also on a 3 to 15 scale. The distribution was slightly negatively skewed (-0.404), indicating generally positive perceptions of bioeconomy-related efficacy. The construct had excellent reliability ($\alpha = 0.85$, $\omega = 0.85$).

Prior Experience (PE), which combined four items, showed a mean of 10.7 (SD = 4.36) on a range of 4 to 20, with a median of 11. The distribution was fairly symmetric (skewness = 0.165), and the scale showed excellent internal consistency ($\alpha = 0.88$).

Performance-Based Culture (PBC), combining five items, showed a mean of 16.9 (SD = 4.25) on a possible range of 5 to 25, with a median of 17. The scale was approximately symmetric (skewness = -0.165) and demonstrated excellent reliability ($\alpha = 0.86$).

Finally, **Socially Supportive Institutional Environment (SSIE)** had a mean of 8.23 (SD = 3.10) on a 3 to 15 scale, with a median of 8. This construct also showed symmetric distribution (skewness = 0.201) and excellent reliability ($\alpha = 0.87$). Overall, the construct-level analysis confirms that the measurement instruments employed in the survey demonstrated strong psychometric properties, with consistently high internal consistency across domains. This provides a robust foundation for further inferential analyses exploring relationships between psychological, behavioural, and socio-demographic factors.

Table 9. Construct-level summary statistics and reliability scores

Statistic	SEI	SESE	SESEB	PE	PBC	SSIE
Mean	8.56	11	10.2	10.7	16.9	8.23
Median	9	11	10	11	17	8
Standard deviation	3.14	2.72	2.95	4.36	4.25	3.1
Minimum	3	3	3	4	5	3
Maximum	15	15	15	20	25	15
Skewness	-0.094	-0.559	-0.404	0.165	-0.165	0.201
Cronbach's α	0.730	0.798	0.845	0.875	0.861	0.866

5.1.2 Correlation between variables

Figure 9 displays the Pearson correlations among the dependent variables: social entrepreneurial intention, social entrepreneurial self-efficacy (including its dimension specific to the circular bioeconomy), and prior experience with social activities. The figure reveals that these dependent variables are strongly correlated, with coefficients ranging from 0.55 to 0.77, suggesting a substantial degree of association while still reflecting meaningful distinctions among them. The two main independent variables exhibit modest positive correlations with the dependent variables, ranging from 0.23 to 0.36, and are moderately correlated with each other ($r = 0.56$).

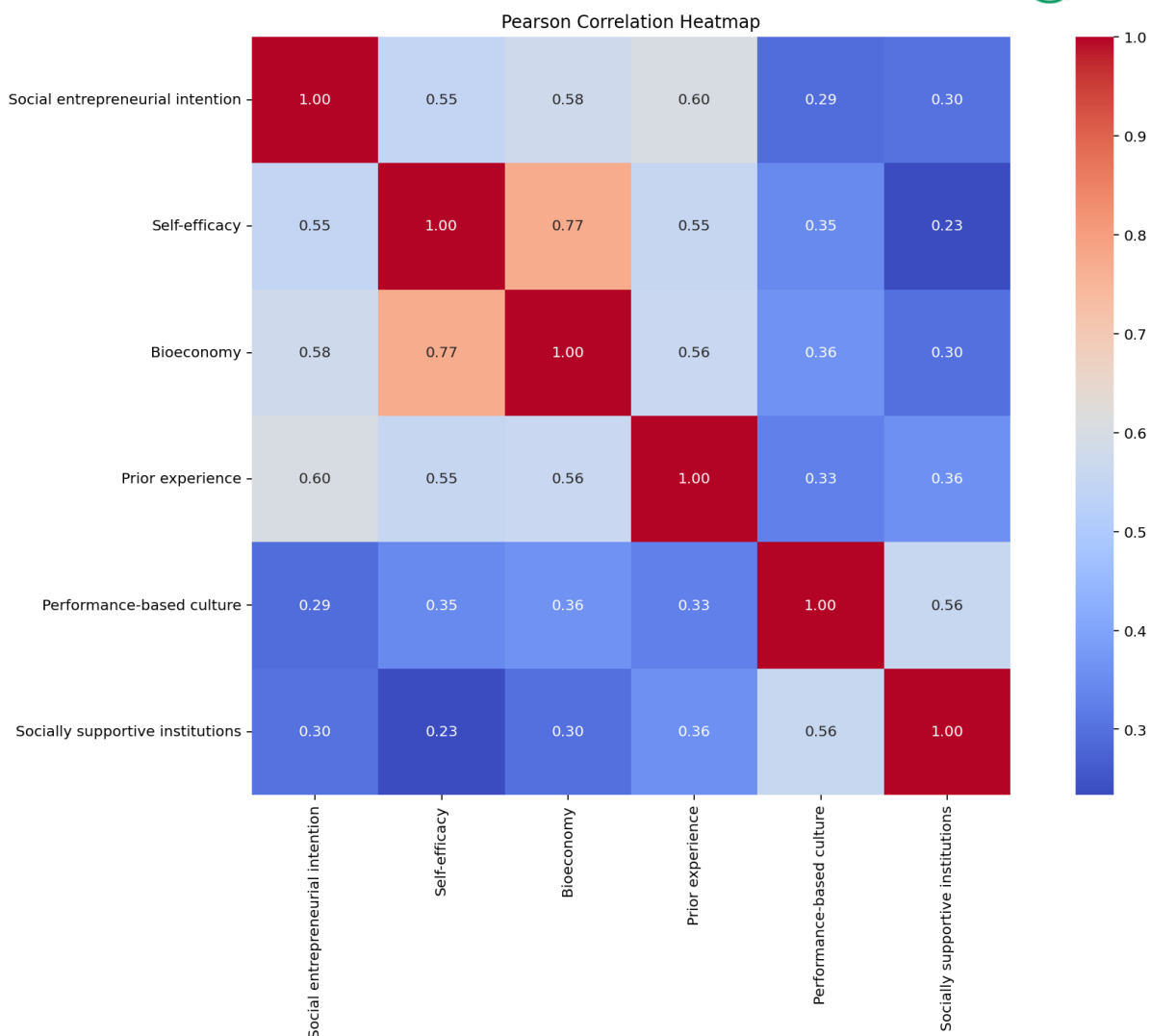


Figure 9. Pearson correlation between the dependent variables and the main independent variables at the individual level

We extend the previous figure by including, in Figure 10, **individual-level control variables** such as age, religion, political orientation, education, personal income, ethnicity, gender (male and non-binary), and city size. Overall, the correlations between the dependent variables and these individual-level controls are modest, ranging from -0.19 to 0.20. Based on the findings in this table, younger respondents appear to have a higher probability of engaging in social entrepreneurial activity. Additionally, being a religious person seems to have a positive association with such engagement. The remaining variables included in the table exhibit correlations close to zero, suggesting only weak or negligible relationships with the dependent variable.

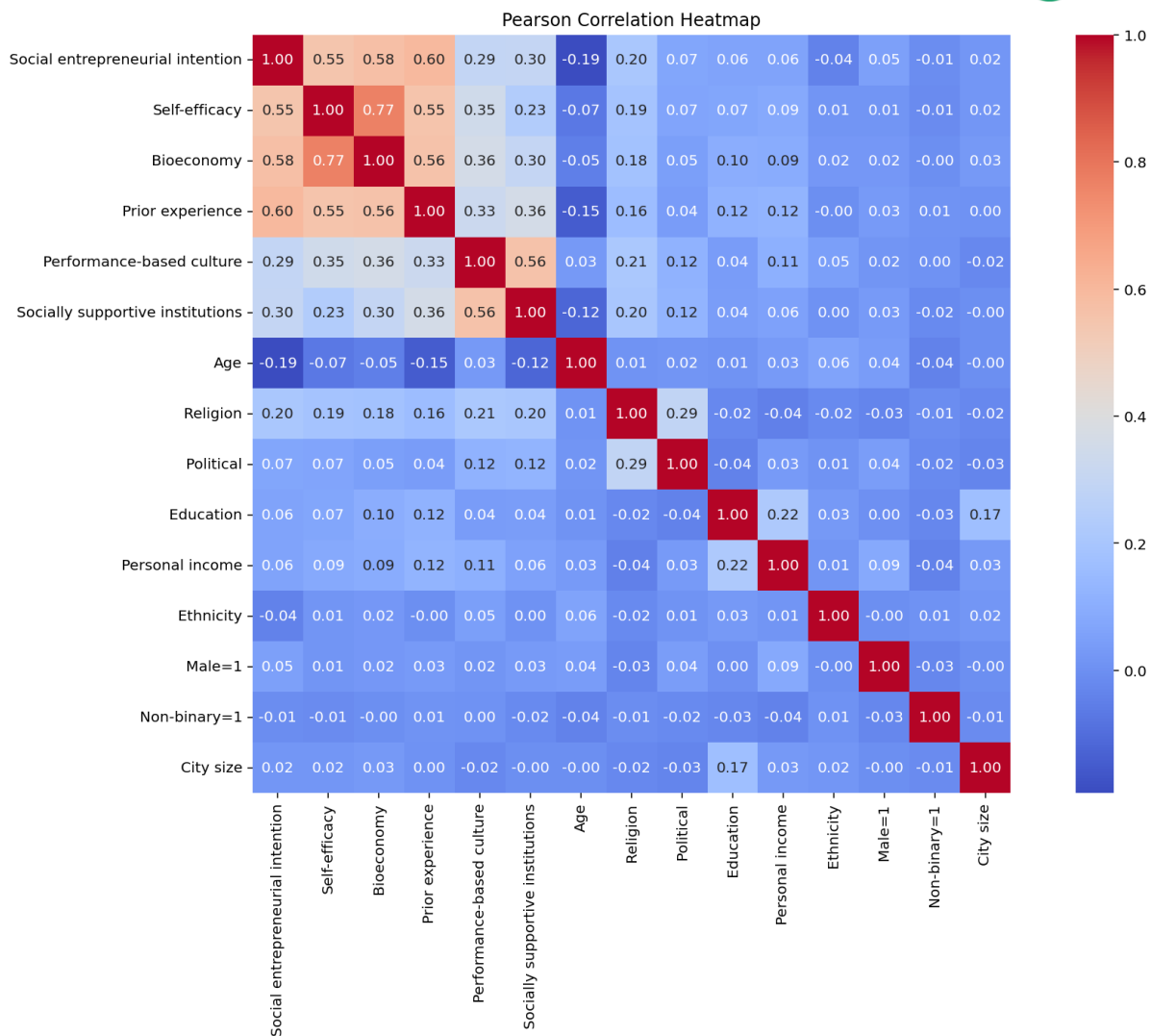


Figure 10. Pearson correlation between the dependent variables, the main independent variables and the controls at the individual level

In addition to the previous two figures, Figure 11 incorporates **regional-level control variables**, including poverty rate, GDP growth, technological development, and population density. The correlations between these variables and the dependent variables are not very strong, with poverty rate showing the highest correlation, approximately 0.1.

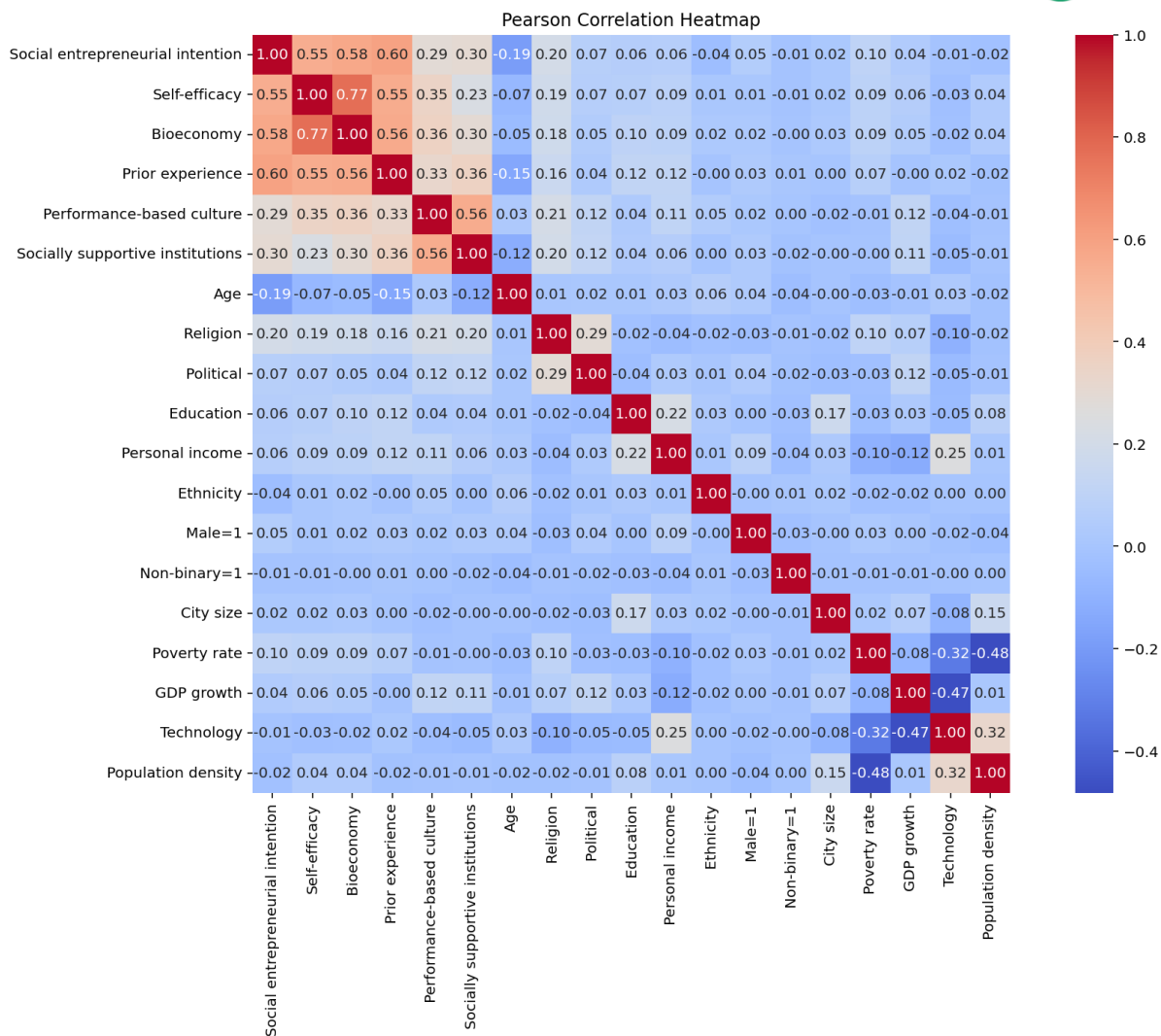


Figure 11. Pearson correlation between the dependent variable, the main independent variables and the controls at the individual level and the regional variables

5.1.3 Participants' socio-demographic profile

Country

The following subsection provides a detailed overview of the basic sample statistics. The survey sample comprised a total of 3,175 participants from four European countries (Table 10), offering a balanced geographical distribution. Respondents were drawn from Greece (25.1%), Italy (25.3%), Poland (25.1%), and Romania (24.6%), providing a solid cross-section of European citizens in regions targeted by the RIBES project.

Table 10. Frequencies of participants by Country

Country	Counts	% of Total
Greece	795	25.1 %
Italy	802	25.3 %

Poland	795	25.1 %
Romania	781	24.6 %
Missing	2	

Age

The age of participants (Table 11) ranged from 14 to 85 years, with an average (mean) age of 44.5 years and a median age of 45 years, reflecting a good representation across younger and older adults alike. In terms of age groups, 10.5% of respondents were between 18 and 24 years, 16.8% between 25 and 34, 20.9% between 35 and 44, 23.9% between 45 and 54, 20.1% between 55 and 64, and 7.6% were aged 65 or older. This spread allows for meaningful comparisons across life stages. The sample was slightly skewed towards female respondents, with 52% identifying as female (n=1648) and 47.7% as male (n=1512). A small proportion (0.1%) identified as non-binary, and another 0.1% chose not to disclose their gender. The environmental context of respondents showed that the majority resided in urban areas (74.8%), followed by semi-urban areas (13.0%) and rural areas (12.2%).

Table 11. Frequencies of participants by Age Group

Age group	Counts	% of Total
18-24	334	10.5%
25-34	533	16.8%
35-44	662	20.9%
45-54	757	23.9%
55-64	639	20.1%
65+	241	7.6%
Missing	9	

Environment

The residential environment (Table 12) of respondents showed that the majority resided in urban areas (74.8%), followed by semi-urban areas (13.0%) and rural areas (12.2%).

Table 12. Frequencies of participants by Residential Environment

Environment	Counts	% of Total
Rural	386	12.2%
Semi-urban	412	13.0%

Urban	2369	74.6%
Missing	8	

Gender

The sample was slightly skewed towards female respondents, with 51.9% identifying as female (n=1648) and 47.6% as male (n=1512). A small proportion (0.1%) identified as non-binary, and another 0.1% chose not to disclose their gender (Table 13).

Table 13. Frequencies of participants by Gender Identity

Gender	Counts	% of Total
Female	1648	51.9%
Male	1512	47.6%
No response	4	0.1%
Non-binary	3	0.1%
Missing	8	

Income

Household income levels (Table 14) varied considerably, with 12.5% of respondents reporting a current net annual household income of €5,000 or less, 19.3% between €5,001 and €15,000, and 25.3% between €15,001 and €25,000—the largest income band. A further 19% reported incomes between €25,001 and €35,000, and smaller proportions fell into higher income categories, with only 1.8% reporting incomes above €75,000.

Table 14. Frequencies of participants by Income Group

Income	Counts	% of Total
€5,000 or less	397	12.5%
€5,001 - €15,000	613	19.3%
€15,001 - €25,000	804	25.3%
€25,001 - €35,000	602	19.0%
€35,001 - €45,000	331	10.4%
€45,001 - €55,000	182	5.7%

€55,001 - €65,000	107	3.4%
€65,001 - €75,000	73	2.3%
€75,001 or more	58	1.8%
Missing	8	

Education

Educational attainment (Table 15) was relatively high across the sample. Nearly half of respondents (44.4%) reported having completed high school or an equivalent qualification, while 25.4% reported some college experience. A further 22% held a bachelor's degree, 3.8% a master's degree, and 2.2% had pursued advanced graduate qualifications such as a PhD. Only a small minority (2.1%) reported not completing formal education. This indicates that the sample was generally well-educated, which may influence attitudes toward social innovation and entrepreneurship.

Table 15. Frequencies of participants by Educational Background

Education	Counts	% of Total
Did Not Complete	68	2.1 %
High School/GED	1406	44.4 %
Some Colleges	803	25.4 %
Bachelor's Degree	698	22.0 %
Master's Degree	121	3.8 %
Advanced Graduate work or Ph,D,	71	2.2 %
Missing	8	

Ethnic

Ethnic identification revealed that most respondents (95.4%) felt part of the same race or ethnic group as most people in their country, while 4.6% reported not feeling this connection.

5.1.4 Insights Across Groups

This subsection explores how key socio-demographic factors—age, gender, environment, education, income, religiosity, political orientation, and country of residence—are associated with social entrepreneurial intention and its psychological and contextual drivers. Mean values and standard

deviations were calculated for all constructs across socio-demographic categories to uncover trends and differences.

Cross-tabulation results by Age Group

The analysis (Table 16) revealed a clear age gradient in social entrepreneurial intention (SEI), with the highest mean scores among the youngest respondents (18–24: 9.30) and a steady decline across older groups, reaching the lowest among those aged 65+ (7.36). Self-efficacy (SESE, SESEB) followed a similar pattern, suggesting that younger individuals feel more confident in their ability to engage in social innovation. Prior experience (PE) was highest among the 25–34 group (11.80), while perceptions of performance-based culture (PBC) and institutional support (SSIE) remained relatively stable but slightly peaked again in the oldest group.

Table 16. Cross-tabulation by Age Group

Age group	SEI	SESE	SESEB	PE	PBC	SSIE
18-24	9.30 (± 2.56)	11.00 (± 2.49)	10.10 (± 2.64)	11.20 (± 3.97)	16.40 (± 3.95)	8.78 (± 2.70)
25-34	9.14 (± 3.02)	11.20 (± 2.58)	10.50 (± 2.77)	11.80 (± 4.20)	17.00 (± 4.14)	8.94 (± 3.07)
35-44	8.94 (± 3.17)	11.20 (± 2.71)	10.50 (± 2.92)	11.20 (± 4.45)	16.90 (± 4.42)	8.30 (± 3.25)
45-54	8.46 (± 3.16)	11.00 (± 2.76)	10.20 (± 3.02)	10.50 (± 4.37)	16.70 (± 4.17)	7.87 (± 3.11)
55-64	7.84 (± 3.26)	10.70 (± 2.78)	9.92 (± 3.11)	9.63 (± 4.30)	16.80 (± 4.43)	7.71 (± 3.08)
65+	7.36 (± 2.90)	10.40 (± 2.95)	9.94 (± 3.10)	9.69 (± 4.15)	17.80 (± 3.93)	8.29 (± 2.74)

Cross-tabulation results by Gender Identity

Regarding Table 17, male respondents reported slightly higher SEI (8.74) and self-efficacy (SESE, SESEB) compared to females (SEI = 8.40), as well as higher prior experience (PE = 10.90). Interestingly, females showed comparable or slightly higher scores in performance-based culture (PBC = 16.80) and institutional support (SSIE = 8.14). The non-binary and no-response groups were too small for reliable interpretation but showed greater variability, with non-binary participants reporting relatively high prior experience (12.00) and cultural support (17.30).

Table 17. Cross-tabulation by Gender Identity

Gender	SEI	SESE	SESEB	PE	PBC	SSIE
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Female	8.40 (±3.17)	10.90 (±2.72)	10.20 (±2.93)	10.50 (±4.38)	16.80 (±4.25)	8.14 (±3.13)
Male	8.74 (±3.10)	11.00 (±2.71)	10.30 (±2.98)	10.90 (±4.32)	16.90 (±4.23)	8.35 (±3.05)
No response	10.50 (±3.42)	10.50 (±5.26)	10.30 (±5.12)	11.30 (±7.97)	9.75 (±5.50)	5.75 (±3.77)
Non-binary	7.67 (±3.21)	10.00 (±2.65)	10.00 (±1.73)	12.00 (±2.00)	17.30 (±4.04)	6.67 (±3.21)

Cross-tabulation results by Residential Environment

Differences across environments (Table 18) were relatively modest. Urban residents reported slightly higher SEI (8.61) and SESE (11.00) than rural or semi-urban residents. Rural respondents, however, showed stronger perceptions of cultural support (PBC = 17.4) and institutional support (SSIE = 8.51), suggesting that rural communities may place more emphasis on collective support structures despite somewhat lower entrepreneurial intention.¹⁵

Table 18. Cross-tabulation by Residential Environment

Environment	SEI	SESE	SESEB	PE	PBC	SSIE
Rural	8.44 (±3.20)	10.90 (±2.88)	10.10 (±3.19)	10.60 (±4.53)	17.40 (±4.69)	8.51 (±3.43)
Semi-urban	8.42 (±2.94)	10.80 (±2.52)	10.10 (±2.66)	10.80 (±4.04)	16.30 (±3.86)	7.74 (±2.88)
Urban	8.61 (±3.16)	11.00 (±2.73)	10.30 (±2.96)	10.70 (±4.38)	16.90 (±4.22)	8.28 (±3.07)

¹⁵ These statistics are based on respondents' self-assessment of their place of residence.

Cross-tabulation results by Educational Background

Social entrepreneurial intention and self-efficacy scores increased steadily with educational attainment (Table 19), peaking among those with master's degrees (SEI = 9.47, SESE = 11.70, SESEB = 11.30). Prior experience (PE) followed the same trend, while perceptions of cultural support (PBC) and institutional support (SSIE) rose moderately with education, highlighting the reinforcing role of education in fostering both competence and opportunity recognition.

Table 19. Cross-tabulation by Educational Background

Education	SEI	SESE	SESEB	PE	PBC	SSIE
Did Not Complete	8.00 (±3.08)	10.00 (±3.55)	8.93 (±3.46)	8.47 (±4.69)	16.30 (±5.44)	7.15 (±3.44)
High School/G ED	8.43 (±3.20)	10.80 (±2.81)	9.97 (±3.01)	10.40 (±4.42)	16.90 (±4.30)	8.28 (±3.11)
Some Colleges	8.55 (±3.00)	11.20 (±2.48)	10.40 (±2.75)	10.50 (±4.10)	16.50 (±4.15)	8.02 (±2.98)
Bachelor's Degree	8.68 (±3.11)	11.10 (±2.64)	10.50 (±2.95)	11.20 (±4.30)	17.10 (±4.09)	8.32 (±3.09)
Master's Degree	9.47 (±3.00)	11.70 (±2.38)	11.30 (±2.51)	12.70 (±4.13)	17.50 (±4.22)	8.89 (±2.96)
Advanced Graduate work or Ph.D.	8.99 (±3.62)	10.80 (±3.22)	10.20 (±3.34)	11.80 (±4.72)	17.70 (±4.26)	8.94 (±3.57)

Cross-tabulation results by Income Group

Household income (Table 20) was positively associated with SEI, self-efficacy, and prior experience. The highest income brackets ($\geq$ €65,000) reported the strongest SEI (9.34–9.76), SESE (11.50–11.90), and PE (12.00–12.90). Performance-based culture (PBC) and institutional support (SSIE) also rose with income, although even the lowest income groups expressed moderate levels of perceived support.

Table 20. Cross-tabulation by Income Group

Income	SEI	SESE	SESEB	PE	PBC	SSIE
€5,000 or less	8.67 (±3.11)	10.60 (±3.41)	9.74 (±3.54)	10.20 (±4.65)	16.30 (±4.90)	8.10 (±3.47)

€5,001 - €15,000	8.28 (±3.08)	10.90 (±2.58)	10.20 (±2.78)	10.20 (±4.32)	16.40 (±4.23)	8.06 (±3.06)
€15,001 - €25,000	8.32 (±3.16)	10.80 (±2.71)	10.10 (±2.90)	10.40 (±4.22)	16.70 (±4.25)	8.03 (±2.91)
€25,001 - €35,000	8.68 (±2.99)	11.00 (±2.49)	10.20 (±2.70)	10.90 (±4.17)	16.90 (±3.98)	8.37 (±2.99)
€35,001 - €45,000	8.79 (±3.08)	11.20 (±2.47)	10.40 (±2.87)	11.20 (±4.22)	17.40 (±3.78)	8.53 (±3.06)
€45,001 - €55,000	8.80 (±3.36)	11.60 (±2.50)	10.90 (±3.02)	11.30 (±4.54)	18.10 (±4.00)	8.66 (±3.20)
€55,001 - €65,000	8.64 (±3.16)	11.10 (±2.79)	10.50 (±2.73)	11.60 (±4.34)	17.20 (±3.97)	8.39 (±3.24)
€65,001 - €75,000	9.34 (±3.38)	11.50 (±2.72)	10.90 (±3.09)	12.00 (±4.87)	18.10 (±3.86)	8.62 (±3.53)
€75,001 or more	9.76 (±3.81)	11.90 (±2.70)	11.40 (±3.40)	12.90 (±4.38)	17.90 (±5.07)	8.67 (±3.07)

Cross-tabulation results by Religiosity

Higher religiosity levels (Table 21) were positively associated with social entrepreneurial intention and self-efficacy. Respondents rating themselves 9 or 10 on the religiosity scale had the highest SEI (9.61–9.65) and SESE (11.7–11.9), along with higher PE and PBC scores. In contrast, those who selected “I don't know” or “0” showed noticeably lower scores in most constructs, suggesting a possible value alignment between prosocial motivation and spiritual orientation. This finding aligns with existing literature, which has shown that religiosity is positively associated with social entrepreneurial intentions (McIntyre et al., 2023).

Table 21. Cross-tabulation by Religiosity

Religious	SEI	SESE	SESEB	PE	PBC	SSIE
0 (not at all religious)	7.43 (±3.29)	10.30 (±2.83)	9.45 (±3.20)	9.61 (±4.30)	15.70 (±4.49)	7.44 (±3.14)
1	7.82 (±3.15)	10.30 (±2.65)	9.43 (±3.00)	9.43 (±4.04)	15.60 (±3.57)	7.27 (±2.51)

2	8.28 (±3.13)	10.70 (±2.44)	9.97 (±2.67)	10.70 (±3.95)	16.40 (±3.83)	7.83 (±2.60)
3	8.21 (±2.89)	10.50 (±2.69)	9.91 (±2.71)	10.30 (±4.21)	16.20 (±3.91)	8.12 (±2.89)
4	8.35 (±2.75)	10.80 (±2.26)	9.84 (±2.44)	10.20 (±3.90)	15.70 (±3.72)	7.56 (±2.72)
5	8.58 (±2.97)	10.70 (±2.73)	10.20 (±2.87)	10.50 (±4.09)	16.50 (±4.04)	7.98 (±3.01)
6	8.32 (±2.99)	10.80 (±2.55)	10.10 (±2.74)	10.50 (±4.04)	16.70 (±3.70)	8.18 (±2.70)
7	8.76 (±2.90)	11.30 (±2.36)	10.40 (±2.72)	10.80 (±4.01)	17.10 (±4.10)	8.36 (±2.84)
8	8.89 (±2.92)	11.40 (±2.53)	10.60 (±2.71)	11.00 (±4.19)	17.30 (±3.74)	8.39 (±2.95)
9	9.61 (±2.99)	11.70 (±2.60)	10.90 (±2.92)	11.90 (±4.34)	18.00 (±3.92)	9.05 (±3.15)
10 (very religious)	9.65 (±3.46)	11.90 (±3.07)	11.30 (±3.23)	12.40 (±5.24)	19.00 (±5.08)	9.78 (±3.74)
I don't know	7.23 (±2.49)	8.69 (±3.21)	8.27 (±3.17)	8.00 (±3.98)	15.00 (±5.27)	6.88 (±3.49)
No response	8.35 (±3.45)	10.60 (±3.27)	9.49 (±3.41)	10.10 (±4.92)	15.70 (±4.74)	7.63 (±3.27)

Cross-tabulation results by Political Orientation

While the left-right political scale (Table 22) showed variability, the highest SEI and SESE scores were found among those identifying on the far right (scores 9–10) and centre-right (scores 7–8). Those on the left or politically uncertain (e.g. “I don't know”) reported lower scores in these dimensions. Interestingly, cultural support (PBC) and institutional support (SSIE) were also highest among those on the political right, indicating a complex relationship between ideology and perceived entrepreneurial environment.

Table 22. Cross-tabulation by Political Orientation

Political	SEI	SESE	SESEB	PE	PBC	SSIE
0 (left)	8.53 (±3.49)	11.10 (±3.00)	10.40 (±3.30)	11.00 (±4.61)	17.40 (±4.60)	7.97 (±3.59)
1	8.21 (±3.22)	10.80 (±2.66)	10.60 (±2.82)	10.50 (±4.42)	16.50 (±3.80)	7.70 (±3.10)
2	7.86 (±3.15)	10.50 (±2.72)	9.77 (±2.78)	10.60 (±3.99)	15.90 (±4.06)	7.78 (±2.80)
3	8.42 (±3.10)	10.90 (±2.49)	10.20 (±2.67)	11.00 (±4.16)	16.80 (±4.16)	8.07 (±2.75)
4	8.28 (±3.02)	10.70 (±2.43)	9.91 (±2.75)	10.20 (±3.89)	15.90 (±4.02)	7.64 (±2.53)
5	8.61 (±3.07)	11.10 (±2.67)	10.30 (±2.91)	10.70 (±4.22)	16.80 (±4.23)	8.20 (±3.06)
6	8.89 (±2.69)	10.90 (±2.52)	10.40 (±2.73)	11.00 (±4.08)	16.90 (±3.57)	8.34 (±2.74)
7	8.50 (±3.00)	11.00 (±2.42)	10.30 (±2.68)	10.70 (±4.17)	17.30 (±3.66)	8.58 (±2.83)
8	9.14 (±2.94)	11.20 (±2.57)	10.60 (±2.82)	11.30 (±4.30)	17.30 (±3.78)	8.74 (±3.05)
9	9.07 (±2.90)	11.40 (±2.52)	10.50 (±2.79)	11.60 (±4.44)	17.40 (±3.97)	8.67 (±3.10)
10 (right)	8.97 (±3.69)	11.70 (±3.23)	10.80 (±3.56)	11.70 (±5.34)	18.90 (±4.97)	9.35 (±3.95)
I don't know	8.00 (±3.22)	10.00 (±2.94)	9.27 (±3.05)	8.72 (±4.07)	16.00 (±4.23)	7.59 (±2.86)
No response	8.21 (±3.19)	10.80 (±2.75)	9.67 (±2.98)	9.86 (±4.24)	15.50 (±4.47)	7.71 (±3.07)

Country Differences

Country comparisons (Table 23) showed notable differences, with Romania reporting the highest SEI (9.12), SESE (11.80), and SESEB (11.00), reflecting strong entrepreneurial sentiment. Poland recorded the highest cultural (PBC = 17.50) and institutional support (SSIE = 8.83), despite lower self-efficacy scores. Italy and Greece were close to the overall average, with Italy showing slightly higher prior experience (11.10) and Greece notable for strong general self-efficacy (SESE = 11.20).

Table 23. Cross-tabulation by Country

Country	SEI	SESE	SESEB	PE	PBC	SSIE
Greece	8.29 (±2.95)	11.20 (±2.36)	10.40 (±2.60)	10.30 (±3.96)	15.90 (±3.89)	7.56 (±2.61)
Italy	8.74 (±3.16)	10.80 (±2.39)	10.10 (±2.66)	11.10 (±4.30)	16.70 (±4.02)	8.07 (±3.07)
Poland	8.10 (±3.22)	10.20 (±3.11)	9.48 (±3.23)	10.50 (±4.49)	17.50 (±4.21)	8.83 (±3.01)
Romania	9.12 (±3.13)	11.80 (±2.71)	11.00 (±3.09)	10.90 (±4.62)	17.30 (±4.64)	8.49 (±3.49)

Further insights into the patterns observed across socio-demographic groups are presented in Annex III (section 8.3), which includes a set of normalised heatmaps. These visualisations, normalised to account for differences in scale among variables, allow for comparative interpretation of key psychological and contextual constructs—such as social entrepreneurial intention, self-efficacy, and cultural perceptions—across variables like age, gender, environment, education, income, religiosity, political orientation, and country of residence.

5.1.5 Regional summary statistics

Table 24 presents summary statistics for the regional-level variables included in the analysis. The poverty rate has a mean of approximately 18.52% and a median of 17.13%, with a standard deviation of 8.5. This indicates that, on average, respondents reside in regions with a poverty rate of 18.52%, though the distribution varies, with some respondents living in regions with poverty rates as low as 4.6% and others in regions where the rate approaches 40%.

The GDP growth variable shows relatively low variation, with a mean of 0.04, a median of approximately 0.03, and a standard deviation of 0.02.

Turning to the technology variable, which is proxied by the number of patent applications in a region, we observe a mean value of 91.5 and a median of 10, with a large standard deviation of 226. This wide dispersion is due to a highly skewed distribution, where some smaller regions report no patent activity, while others exceed 1,000 applications. To account for this skewness, we apply a log-plus-one transformation of this variable in the regression analysis.

Lastly, the population density variable reflects the size and degree of urbanization in each region. It also shows considerable variation, with a mean of 309369 and a median of 132684. This range reflects the contrast between sparsely populated regions, with densities as low as 27778, and highly urbanized areas, where densities exceed 1000000.

Table 24. Summary statistics of the regional variables

Statistic	Poverty Rate	GDP Growth	Technology	Population Density
Mean	18.517	0.042	91.459	309369.617
Median	17.133	0.027	9.991	132684.120
Standard deviation	8.505	0.022	226.048	360456.229
Minimum	4.617	0.012	0.000	27778.051
Maximum	39.948	0.088	1011.829	1355058.340
Number of Observations	3161	3161	3161	3161

Notes: Notes: Poverty is measured as a percentage (0–100). GDP growth is calculated as the fractional change in GDP, also known as the relative or per-unit change. Technology is measured as the proportion of patents within a region. Population density is defined as the total number of inhabitants per square kilometre. All variables are averaged over time.

5.2 Geographic patterns

In this section, we compute the average values of four key indexes, social entrepreneurial intention, social entrepreneurial self-efficacy, self-efficacy for bioeconomy-related entrepreneurship, and prior experience in self-entrepreneurial activities, for each NUTS 2 region. These regional averages are then linked to the most recent Eurostat-GISCO shapefile (2024) using QGIS.¹⁶ Finally, we visualize the spatial distribution of these indexes to explore their regional variation across Europe. In addition, we compute the same graph for poverty rate as one of the potential regional drivers of social entrepreneurial activities. The visualizations reveal substantial regional heterogeneity in both the outcomes and the poverty rate.

¹⁶ Source: <https://ec.europa.eu/eurostat/web/gisco/geodata/statistical-units/territorial-units-statistics>

Social Entrepreneurial Intention

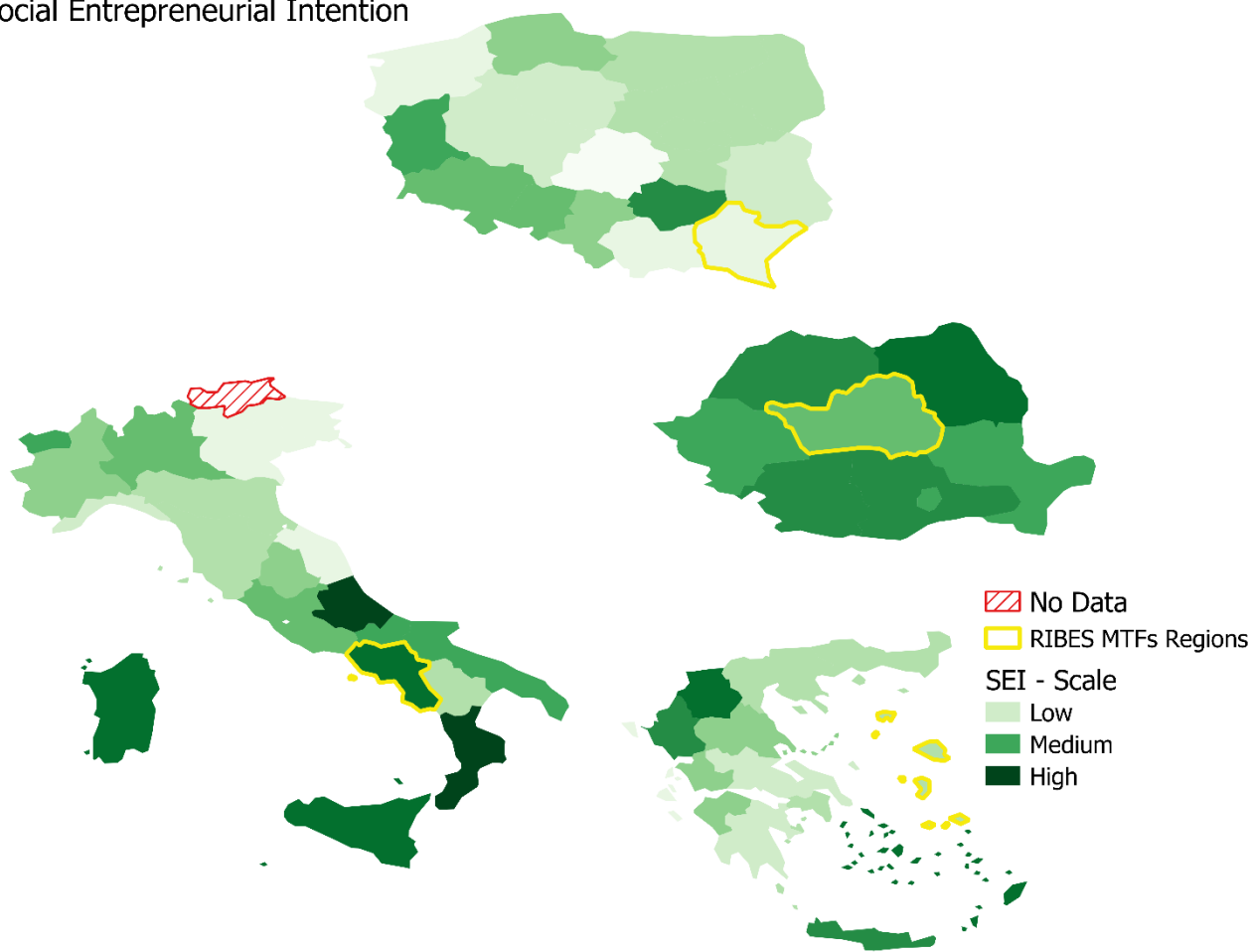


Figure 12. Social Entrepreneurial Intention by Region (NUTS 2 level)

Figure 12 illustrates the spatial distribution of the social entrepreneurial intention index for European regions. In Italy, a clear north-south divide emerges, with higher values concentrated in the southern regions. The index ranges from 6.9 in some northern regions to 10.1 in parts of the South. In Greece, elevated levels are observed in the South Aegean islands and Epirus, while lower values appear in major urban centres such as Athens and Thessaloniki. Romania shows generally higher index values compared to the other three countries, particularly in regions bordering other EU countries. Slightly lower values are reported for the capital region of Bucharest. In contrast Poland exhibits overall lower levels of social entrepreneurial intention, except for certain border regions adjacent to Czechia and Germany and the rural province of Świętokrzyskie Voivodeship which has the highest value of the whole country. The index ranges from a 6.9 to a 10.1, with darker colours representing regions with higher levels of prior experience in social entrepreneurship Index.

Social Entrepreneurial Self-Efficacy

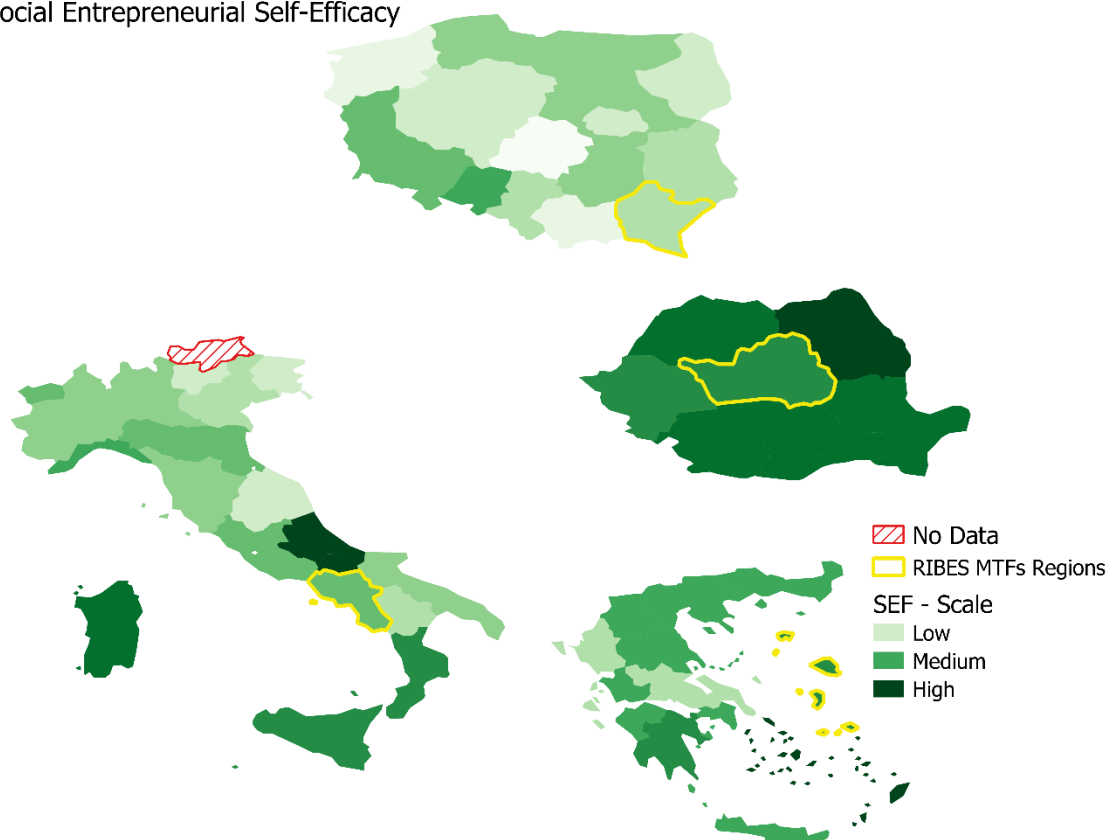


Figure 13. Social Entrepreneurial Self-Efficacy by Region (NUTS 2 level)

Figure 13 illustrates the geographical variation in the social entrepreneurial self-efficacy index. Like Figure 12, we observe higher values of self-efficacy in Central and Southern Italy. Once again, Romania exhibits the highest values among all participating countries. Poland shows a comparable pattern to Figure 12, albeit less pronounced, with the highest values concentrated in border regions. In contrast, Greece displays limited spatial variation, as most regions report similar index values with South Aegean islands having the highest values again. Overall, the social entrepreneurial self-efficacy Index tends to be higher than the social entrepreneurial Index. The index ranges from an 8.91 to a 12.38, with darker colours representing regions with higher levels of prior experience in social entrepreneurship Index.

Self-Efficacy for Bioeconomy

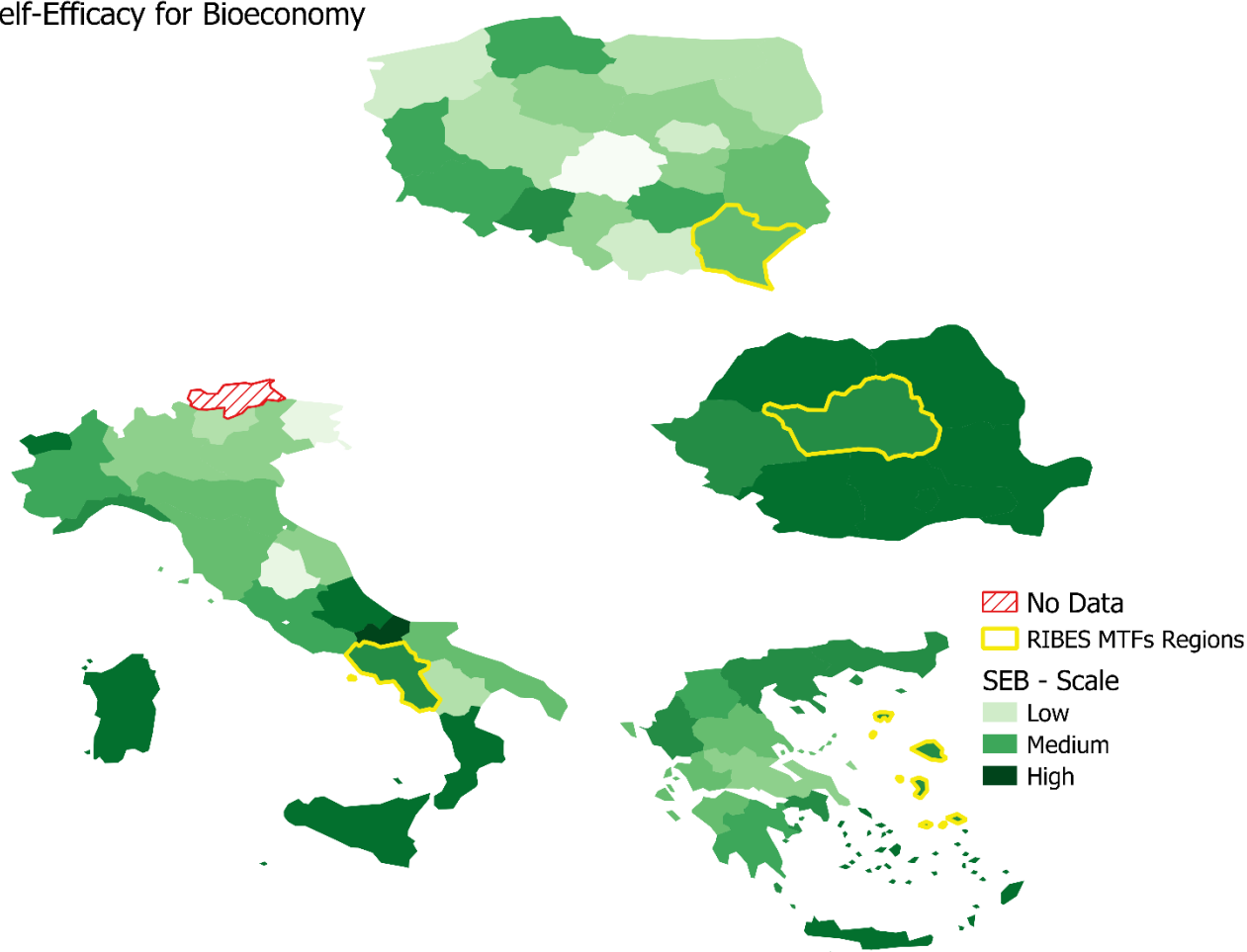


Figure 14. Self-Efficacy for Bioeconomy by Region (NUTS 2 level)

Figure 14 presents the Social Entrepreneurial Self-Efficacy Index for the circular bioeconomy. The pattern remains consistent with Figure 12 and Figure 13 for Italy, Romania, and Poland, with Romania once again displaying the highest values among all countries. This time, Greece shows more noticeable spatial variation, with the highest values found in the South Aegean islands, Epirus, and Crete. A key difference from the previous figures is that regions containing major urban centres—such as Athens and Thessaloniki—also exhibit high index values in this case. In contrast, Central Greece reports the lowest values. Overall, the magnitude of the index in Figure 13 is comparable to that of the general Social Entrepreneurial Self-Efficacy Index. The index ranges from an 8.09 to a 11.75, with darker colours representing regions with higher levels of prior experience in social entrepreneurship Index.

Prior Experience

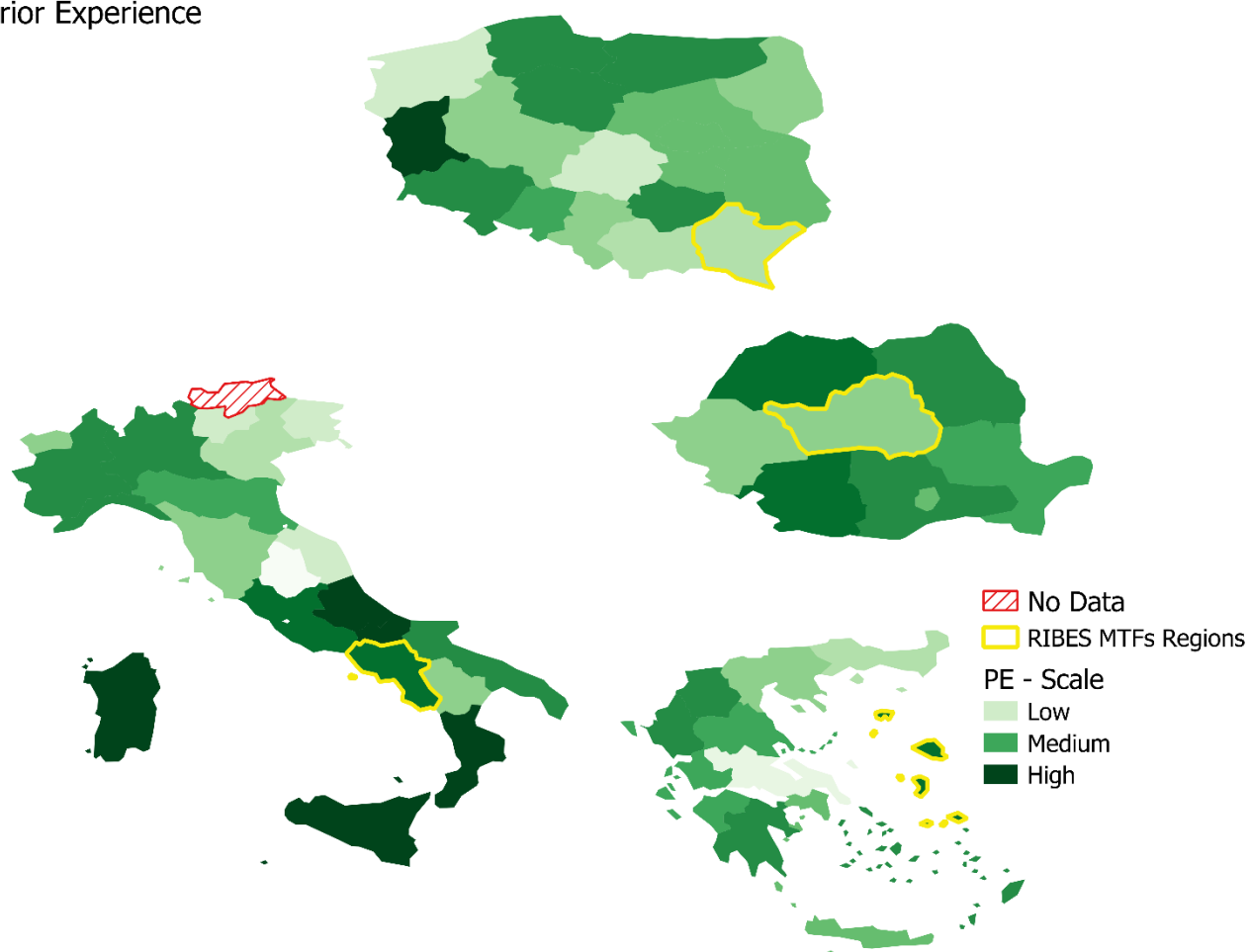


Figure 15. Prior Experience with Social Entrepreneurship (NUTS 2 level)

Figure 15 presents the prior experience in the social entrepreneurship Index, offering new insights into its spatial distribution. In contrast to the previous figures—where Romania consistently showed the highest values—Southern Italy now emerges with the highest scores across all countries. Poland continues to follow a similar pattern, with elevated values in border regions, and the region of Lubuskie stands out with one of the highest scores across all surveyed areas. Compared to the previous three figures, Romania records lower values on this index. In Greece, the South Aegean islands, Epirus, and the Peloponnese display high index values. Overall, the scale of this index is comparable to that of Social Entrepreneurial Intention. The index ranges from a 6.25 to a 9.88, with darker colours representing regions with higher levels of prior experience in social entrepreneurship Index.

Regional Poverty Rate

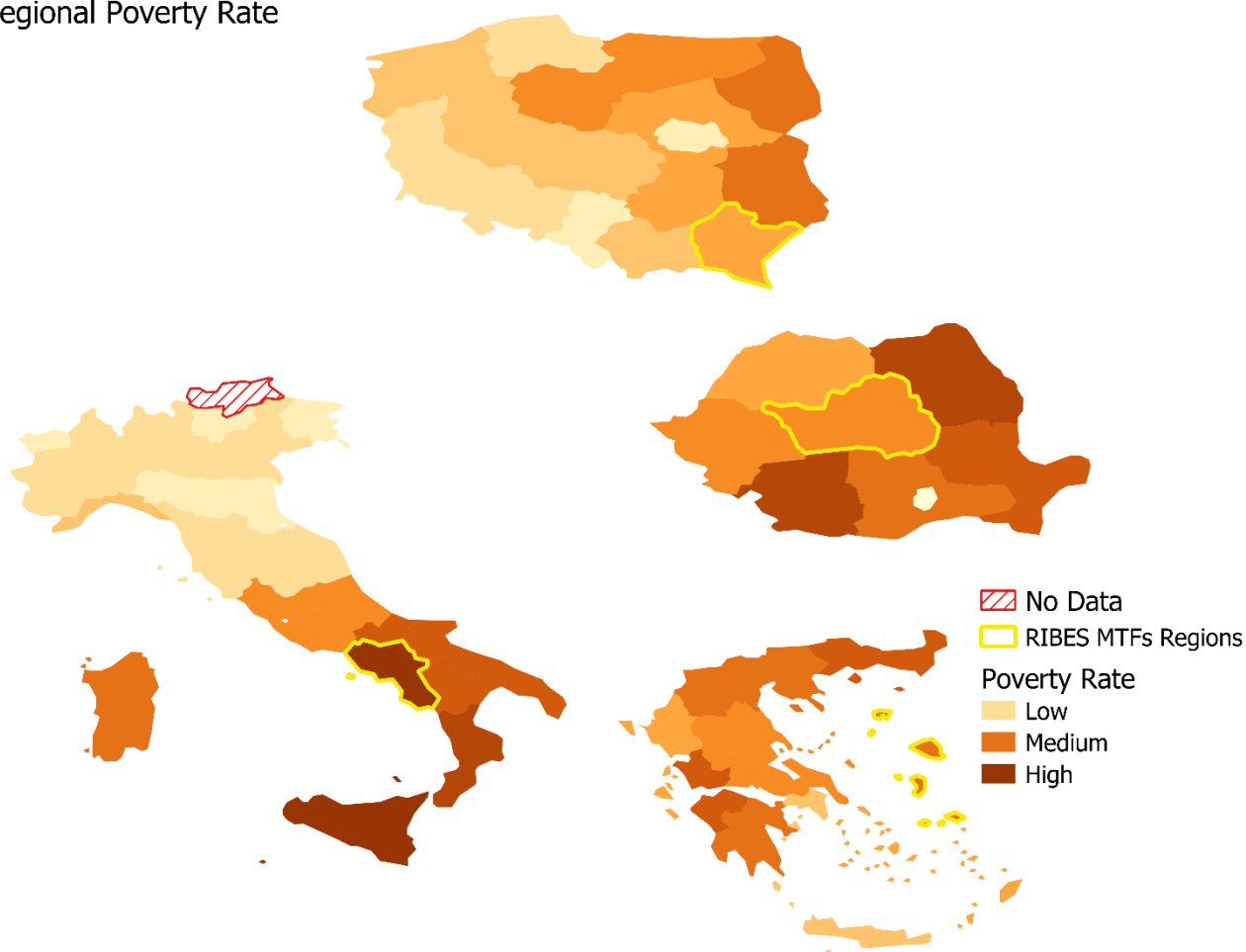


Figure 16. Regional Poverty Rate (NUTS 2 level)

Figure 16 displays poverty rates across European regions. Southern Italy reports the highest poverty rates overall. In Romania, most regions also exhibit high poverty levels. In Greece, elevated poverty rates are observed particularly in the Peloponnese and parts of Macedonia. In Poland, the highest values appear in regions bordering Ukraine and Belarus. The index ranges from a 5% to a 40% poverty rate, with darker colours representing regions with higher levels of poverty.

These spatial patterns suggest that metropolitan NUTS 2 regions may benefit most from innovation incentives, while rural and peripheral areas could gain from strengthened infrastructure and capacity-building. Integrating these insights into the WP4 Governance Toolkit offers flexible, region-specific policy levers. This approach allows policymakers to adapt interventions to local contexts and evolving needs.

5.3 Modeling

5.3.1 Development of variables

We begin our data preparation by cleaning and standardizing the town of residence reported by each respondent. To achieve this, we apply geocoding in Python using the Nominatim service from OpenStreetMap (OSM), which converts place names into geographic coordinates.¹⁷ This step enables us to correct inconsistencies in city names—such as “Milan” versus “Milano”—and ensures a more accurate and unified dataset. The resulting geographic coordinates are assigned to each respondent and subsequently imported into QGIS. Using the latest NUTS 2 boundary shapefiles provided by Eurostat (2024), we spatially match respondents to their corresponding NUTS 2 region. This spatial join ensures that all respondents can be accurately linked to the regional-level indicators from Eurostat.

For consistency and comparability, we use a fixed sample size in all regression analyses. In addition, the religion variable has 97 missing values, and political preferences have 411 missing values. To preserve the full sample, we imputed the missing values using the mean of the respective index in each case. To account for potential bias introduced by this imputation, we included two additional dummy variables in the regression models, one for religion and one for political preferences, coded as 1 for observations with imputed values and 0 otherwise. This approach allows us to retain the full sample while controlling any systematic differences in the missing data (Cohen, et al., 2003).

The GDP growth is computed as the fractional change (also known as per unit change or relative change) by NUTS 2 regions. We aggregated the number of patents at the NUTS 2 level based on the location of the inventors and we apply fractional count.¹⁸ We use the number of patents at the regional level to proxy for the level of technology and innovation of the NUTS 2 regions. We then calculate population density by dividing the population by the area.

To reduce the influence of outliers and mitigate the impact of temporary regional shocks, we compute long-term averages for our key regional variables. Specifically, we calculate the average population density over a 10-year period (2015–2024), the average GDP growth over 23 years (2000–2022), the at-risk-of-poverty rate over 21 years (2002–2022), number of patents over 43 years (1978–2021). These time-averaged measures provide more stable and representative indicators of regional characteristics.¹⁹

¹⁷ Python is a high-level, general-purpose programming language.

¹⁸ We adjusted and corrected the NUTS 2 definition of regions in the patent data to align with most recent NUTS 2 definition of regions provided by Eurostat. Fractional counting was applied to patents, meaning that each inventor received a proportional share of a patent based on the number of listed inventors.

¹⁹ Regarding poverty rate coverage varies across regions due to differences in data availability.

Next, we efficiently merge the regional variables to the respondents using the most recent NUTS 2 definition of regions provided by EUROSTAT (2024).

Summary of Regional indices

Population density: The 10 years mean of total population divided by area capturing the intensity of human presence in each region. A proxy for urbanization.

Growth of regional gross domestic product (GDP) adjusted for purchasing power standards (PPS): The 23 years mean of GDP growth adjusted for purchasing power standards (PPS).

Poverty Rate: The 21 years mean of at-risk-of-poverty rate.

Technology: The 43 years mean of the fractional number of patents in logarithmic form.

5.3.2 Modelling

We employ a series of Ordinary Least Squares (OLS) regression models to analyse our dataset. These models allow us to examine the effects of individual characteristics and regional factors on key outcomes, including social entrepreneurial intention, the social entrepreneurial self-efficacy index, the self-efficacy index for circular bioeconomy-related entrepreneurship, and prior experience with social entrepreneurship. To control for unobserved heterogeneity at a more granular level, we include town fixed effects in the individual-level models, thereby accounting for municipality-specific factors that could otherwise bias our results and country fixed effect in the regional level models. Since our analysis is cross-sectional, we use time-averaged values of the main regional independent variables to mitigate the influence of time-specific shocks within regions. Finally, we cluster the standard errors at the town level to correct for heteroskedasticity and within-town autocorrelation, ensuring more robust inference by adjusting for correlated and non-constant error variance within clusters. The analysis was conducted in Python using the statsmodels library, which enables the specification and estimation of statistical models through R-style formula syntax.

5.4 Key findings

We highlight in **green** the coefficients that are positive and statistically significant, and in **red** those that are negative and statistically significant. Clustered standard errors at the town level are reported in parentheses. Asterisks indicate levels of statistical significance: $p^{***} < 0.01$ (), $p^{**} < 0.05$ (), and $p^* < 0.10$ (). All variables have been standardized to have a mean of zero and a standard deviation of one, allowing for direct comparison of coefficients in the regression models.

5.4.1 Social entrepreneurial intention models

We begin by presenting the results for the social entrepreneurial intention models in Table 25. In column (1) we report that performance-based culture and socially supportive institutions exhibit a strong and statistically significant effect approximately 0.17 and 0.15 respectively. This implies that a one standard deviation increase in performance-based culture is associated with a 0.17 standard deviations increase in social entrepreneurial intention. Religion is another variable that shows a positive and significant association with social entrepreneurship. Individuals with stronger religious affiliation tend to have a more favourable attitude toward social entrepreneurship, with a coefficient of 0.13. Education appears to have a weak positive effect on the social entrepreneurial intention with a coefficient of approximately 0.05. Lastly, age shows a strong negative relationship with social entrepreneurship with a coefficient of 0.19. This indicates that older individuals are less likely to express an interest in social entrepreneurship. Column (1) includes town fixed effects to account for unobserved regional factors that may influence outcomes at the town level. The adjusted R^2 value is 0.17, indicating that the combination of individual-level variables and town fixed effects explains 17% of the variation in the social entrepreneurial intention.

Moving to column (2) we replace town fixed effects with country fixed effects, as our aim is to examine the influence of regional-level factors on the development of social entrepreneurship intentions. One of the most robust regional predictors is the poverty rate, which shows a strong and statistically significant effect. The coefficient is 0.06 suggesting that one standard deviation increase in poverty rate corresponds to 0.06 standard deviations increase in the social entrepreneurial intention. The other regional variables do not appear to have a significant effect on social entrepreneurship. Interestingly, some individual-level variables that were not significant in column (1) become significant in this model. This is likely due to the shift from town to country fixed effects, which no longer account for variation at the more granular regional level. For example, the significance of the male variable in Column (1) may reflect unaccounted town-level heterogeneity that was previously absorbed by the town fixed effects in the individual-level models. The adjusted R^2 values remain in the same levels as in column (1).

Overall, individuals who score higher in performance-based culture, socially supportive institutions, and religious preferences are more likely to develop social entrepreneurial intentions. Additionally, younger individuals tend to exhibit stronger social entrepreneurial intentions. Finally, the regression results indicate that individuals from regions with higher poverty rates are more likely to have elevated levels of social entrepreneurial intention.

Table 25. OLS Regression Results – Social Entrepreneurial intention

Variable	SEI	
	(1)	(2)
Individual Variables		
Performance-based culture	0.167*** (0.033)	0.187*** (0.022)
Socially supportive institutions	0.148*** (0.040)	0.146*** (0.024)
Religion	0.132*** (0.034)	0.128*** (0.021)
Political	0.026 (0.029)	0.001 (0.018)
Age	-0.192*** (0.033)	-0.189*** (0.019)
City Size	-0.024 (0.040)	0.019 (0.017)
Ethnicity	-0.030 (0.028)	-0.033* (0.018)
Education	0.046* (0.025)	0.050*** (0.017)
Personal Income	0.036 (0.029)	0.029 (0.019)
Male=1	0.038 (0.025)	0.046*** (0.017)
Non-Binary=1	-0.011 (0.019)	-0.006 (0.012)
Regional Variables		
Poverty Rate		0.062*** (0.023)
GDP growth		0.068 (0.098)
Technology		0.008 (0.030)
Population Density		-0.017 (0.021)
Town Fixed Effects	Yes	No
Country Fixed Effects	No	Yes
R ²	0.451	0.191
Adjusted R ²	0.176	0.186
Observations	3146	3146

Notes: Cluster standard errors at the town level are reported in parentheses. The p-values for the asterisks are 0.10 (*), 0.05 (**), and 0.01 (***).

5.4.2 Social entrepreneurial self-efficacy models

We apply the same empirical strategy to examine the impact of individual-level (Column 1) and regional-level (Column 2) variables on social entrepreneurial self-efficacy, as presented in Table 26. Our results indicate that performance-based culture exerts a strong and positive influence on self-efficacy in the context of social entrepreneurship. As a magnitude it is much higher comparing to the one in Table 2

indicating that for social entrepreneurial, self-efficacy performance-based culture is a much stronger driver. Unlike the findings in Table 25, socially supportive institutions do not show a significant effect in this case. Consistent with the results in Table 25, religiosity emerges as a robust predictor of social entrepreneurial self-efficacy. Higher levels of religiosity are being associated with higher social entrepreneurial self-efficacy. Additionally, we find that personal income has a statistically significant positive effect, with a coefficient of approximately 0.10. This means that higher levels of personal income correspond to a higher level of social entrepreneurial self-efficacy.

Again, in column (2) we replace town fixed effects with country fixed effects and this time we observe a reduction in terms of R^2 values with model of column (1) explaining 23% of the variation of the dependent variable while column (2) 20%. We report a significant but weaker effect relative to Table 25 for the poverty rate. The other regional variables do not appear to have a significant effect on social entrepreneurial self-efficacy.

Table 26. OLS Regression Results – Social Entrepreneurial self-efficacy

Variable	SEF	
	(1)	(2)
Individual Variables		
Performance-based culture	0.286***	0.301***
	(0.033)	(0.023)
Socially supportive institutions	0.033	0.045*
	(0.037)	(0.023)
Religion	0.068**	0.091***
	(0.027)	(0.019)
Political	0.028	-0.001
	(0.027)	(0.017)
Age	-0.107***	-0.087***
	(0.036)	(0.021)
City Size	-0.011	-0.008
	(0.040)	(0.017)
Ethnicity	0.020	0.018
	(0.028)	(0.017)
Education	0.029	0.040*
	(0.029)	(0.020)
Personal Income	0.096***	0.081***
	(0.030)	(0.019)
Male=1	-0.020	-0.002
	(0.031)	(0.021)
Non-Binary=1	-0.000	-0.005
	(0.033)	(0.016)
Regional Variables		
Poverty Rate		0.052*
		(0.030)
GDP growth		0.134
		(0.116)
Technology		0.004
		(0.037)
Population Density		-0.007
		(0.028)
Town Fixed Effects	Yes	No
Country Fixed Effects	No	Yes
R ²	0.487	0.207
Adjusted R ²	0.230	0.202
Observations	3146	3146

Notes: Cluster standard errors at the town level are reported in parentheses. The p-values for the asterisks are 0.10 (*), 0.05 (**), and 0.01 (***).

Overall, we report that higher values of performance-based culture, religion and personal income are being associated with higher values of social entrepreneurial self-efficacy. Again, younger people show higher values for social entrepreneurial self-efficacy and from the regional variables' poverty has a weak positive effect.

5.4.3 Social entrepreneurial self-efficacy for bioeconomy models

Next, we empirically examine the influence of the same set of variables on social entrepreneurial self-efficacy in the context of circular bioeconomy (Table 27). Our findings indicate that performance-based culture, socially supportive institutions, and religiosity are strong and consistent positive predictors—mirroring the results reported in Table 25 for social entrepreneurial intention. In addition, we find that both education and personal income are significant and positive contributors to bioeconomy-specific self-efficacy, while age exerts a weak negative effect, consistent with previous patterns observed in our analysis. Again, in column (2) we replace the town fixed effects with country fixed effects and we include the regional variables. In line with previous estimates for the other econometric models we report a strong positive effect of poverty on social entrepreneurial self-efficacy for bioeconomy. We find a higher adjusted R^2 for column (1) indicating that the empirical model explains 23% of the variation of the dependent variable.

Table 27. OLS Regression Results – Social Entrepreneurial self-efficacy for bioeconomy

Variable	SEB	
	(1)	(2)
Individual Variables		
Performance-based culture	0.270*** (0.034)	0.269*** (0.023)
Socially supportive institutions	0.112*** (0.035)	0.130*** (0.023)
Religion	0.074*** (0.025)	0.087*** (0.017)
Political	0.001 (0.025)	-0.020 (0.017)
Age	-0.067* (0.037)	-0.057*** (0.021)
City Size	-0.015 (0.042)	-0.002 (0.017)
Ethnicity	0.026 (0.029)	0.022 (0.018)
Education	0.063** (0.032)	0.062*** (0.021)
Personal Income	0.090*** (0.029)	0.075*** (0.019)
Male=1	-0.025 (0.028)	0.004 (0.020)
Non-Binary=1	0.010 (0.025)	0.007 (0.011)
Regional Variables		
Poverty Rate		0.068** (0.028)
GDP growth		0.116 (0.113)
Technology		-0.000 (0.039)
Population Density		0.009 (0.025)
Town Fixed Effects	Yes	No
Country Fixed Effects	No	Yes
R ²	0.487	0.215
Adjusted R ²	0.231	0.210
Observations	3146	3146

Notes: Cluster standard errors at the town level are reported in parentheses. The p-values for the asterisks are 0.10 (*), 0.05 (**), and 0.01 (***).

5.4.4 Prior experience with social entrepreneurship models

Finally, we include regression results about the impact of individual and regional variables on prior experience with social entrepreneurship (Table 28). We find that performance-based culture, socially supportive institutions, and religiosity are strong and consistent positive predictors of prior experience

with social entrepreneurship. A negative effect is again reported for age while education and personal income appear to have a positive effect. Identifying as non-binary (relative to female) appears to have a strong positive effect on prior experience in social entrepreneurship. However, this result should be interpreted with caution due to the small number of respondents in this category.²⁰ Finally, other individual level variables do not appear to have a significant effect on social entrepreneurial activity.

Moving in column (2), in the regional model, we report a strong and positive significant relationship for poverty on prior experience with social entrepreneurship. GDP growth also shows a weak but significant positive effect. However, this effect is not consistent across the other models. The lack of consistency appears to be due to an increase in the magnitude of the coefficient, while the standard errors remain relatively stable across specifications. The other regional variables do not appear to have a significant effect on social entrepreneurship.

Robustness Check

In Annex IV, we estimate multilevel linear models (MLMs) to examine the determinants of social entrepreneurial outcomes, with individuals (Level 1) nested within NUTS-2 regions (Level 2). The models include random intercepts at the regional level to account for unobserved heterogeneity across regions. All models incorporate both individual-level (e.g., age, education, political and religious orientation) and regional-level (e.g., GDP growth, poverty rate, population density) predictors, as well as country fixed effects. Standard errors are clustered at the regional level to account for intra-region correlation, and continuous variables are standardized to aid interpretation and comparability. The results closely align with those from the linear model, reinforcing the overall reliability of our findings.

²⁰ Only three respondents are non-binary in the sample.

Table 28. OLS Regression Results – Prior experience

Variable	PE	
	(1)	(2)
Individual Variables		
Performance-based culture	0.187*** (0.030)	0.183*** (0.021)
Socially supportive institutions	0.184*** (0.034)	0.218*** (0.022)
Religion	0.102*** (0.029)	0.089*** (0.019)
Political	0.002 (0.027)	-0.024 (0.017)
Age	-0.139*** (0.031)	-0.140*** (0.020)
City Size	-0.044 (0.041)	-0.003 (0.018)
Ethnicity	0.000 (0.025)	-0.006 (0.017)
Education	0.093*** (0.026)	0.090*** (0.018)
Personal Income	0.050** (0.024)	0.059*** (0.017)
Male=1	0.022 (0.024)	0.014 (0.016)
Non-Binary=1	0.016*** (0.003)	0.013*** (0.002)
Regional Variables		
Poverty Rate		0.073*** (0.028)
GDP growth		0.196* (0.115)
Technology		0.013 (0.032)
Population Density		-0.033 (0.028)
Town Fixed Effects	Yes	No
Country Fixed Effects	No	Yes
R ²	0.478	0.211
Adjusted R ²	0.217	0.206
Observations	3146	3146

Notes: Cluster standard errors at the town level are reported in parentheses. The p-values for the asterisks are 0.10 (*), 0.05 (**), and 0.01 (***).

5.4.5 Sample and Power

To ensure the robustness of our findings, we conducted a post-hoc power analysis. The final analytical sample comprised $N = 3,146$ respondents, meeting the survey's planned target across Greece, Italy, Poland, and Romania (see Section 4.1 of the deliverable). After pre-testing, translation, and rigorous data cleaning, this sample size provided robust representation and data quality for all subsequent analyses.

For the main regression analyses (15 predictors), a medium effect size was assumed ($f^2 = 0.2$), with significance threshold $\alpha = 0.05$. The KPI required a minimum statistical power of 95% ($1-\beta$) for detecting effects of this magnitude. Statistical power was assessed post-hoc using G*Power 3.1.9.7 (Faul et al., 2009), specifying a fixed model for R^2 deviation from zero in linear multiple regression.

As shown in Figure 18 and supported by the G*Power output (Figure 17), the achieved statistical power with the final sample size was 1.00 (rounded), indicating that the analysis was capable of detecting medium-sized effects with essentially 100% probability. In fact, the power curve shows that power exceeded the required 95% with a sample size of just over 400, confirming the more-than-adequate sensitivity of the survey.

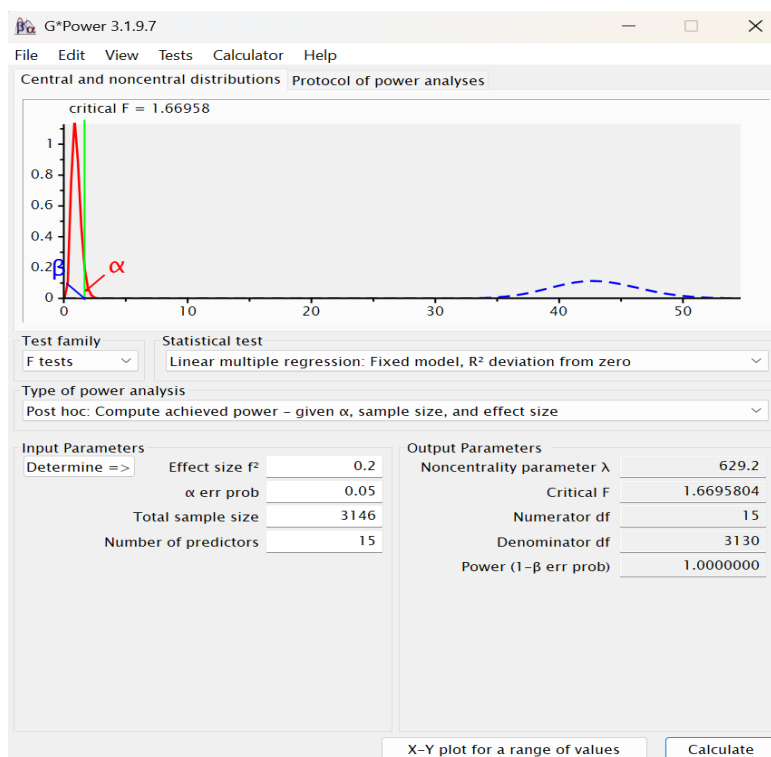


Figure 17. G* Power output

These results confirm that the KPI requirement in task 2.3 for statistical power was fully met and exceeded. The sample size provided ample power to detect the target effects, and all analyses can be interpreted with high statistical confidence.

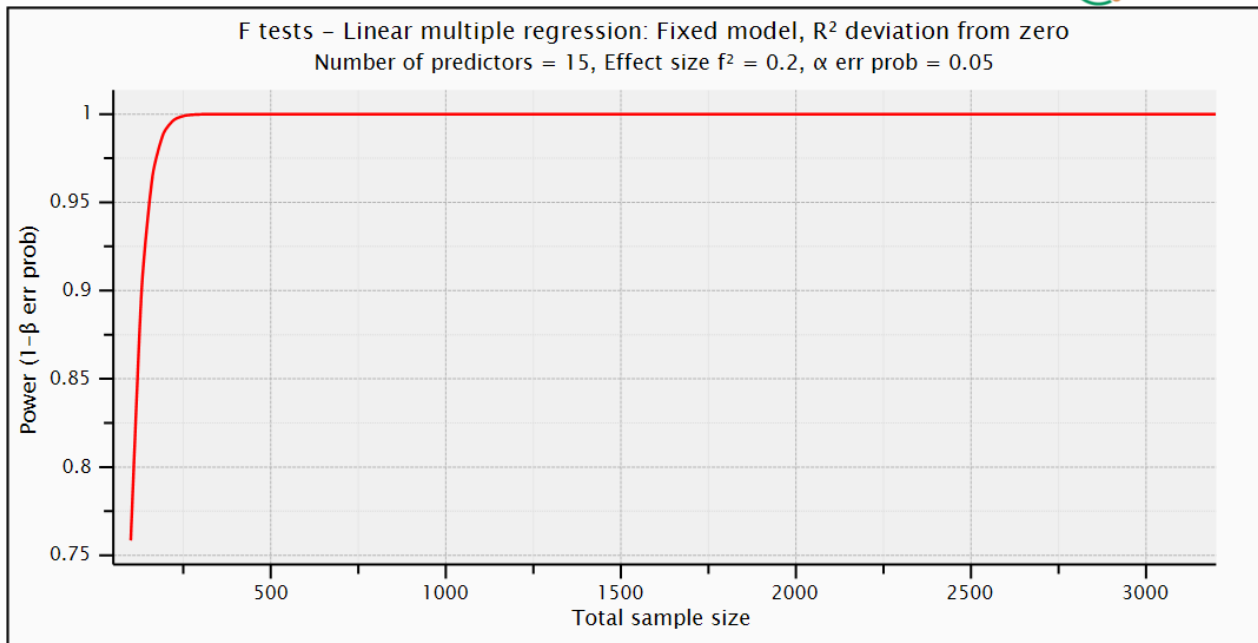


Figure 18. Power curve of sample size

5.5 Discussion

The sample for this study comprised 3,175 participants from four European countries—Greece, Italy, Poland, and Romania—providing a balanced regional representation across Southern and Eastern Europe. The demographic profile showed good variability across age, gender, education, income, and residential context, which strengthens the external validity of the findings. Descriptive statistics revealed moderate to high levels of social entrepreneurial intention and self-efficacy among respondents, with generally positive attitudes towards engaging in social and environmental problem-solving through entrepreneurship. However, experience in the circular bioeconomy sector remained notably low, suggesting that, while interest and perceived capacity are present, sector-specific exposure and engagement are still limited. Institutional support was perceived as weakest among the measured constructs, indicating a structural gap between entrepreneurial potential and enabling environments.

The cross-tabulation analyses uncovered consistent patterns across socio-demographic groups. Younger respondents demonstrated significantly higher levels of social entrepreneurial intention and self-efficacy, which declined steadily with age. Educational attainment and income also showed positive associations with the key constructs, suggesting that social entrepreneurship is more prominent among individuals with greater resources or qualifications. Gender differences were minimal overall, though men reported slightly higher self-efficacy and prior experience. Rural respondents perceived higher cultural and institutional support compared to urban ones, potentially reflecting stronger local community ties. Political orientation and religiosity showed a positive gradient, with individuals on the right and those with higher religious commitment scoring consistently higher on social entrepreneurial dimensions.

Across all regression models, the most consistent individual-level predictors of the dependent variables—social entrepreneurial intention, social entrepreneurial self-efficacy, bioeconomy-specific self-efficacy, and prior experience with social activities—are performance-based culture, religiosity, and

age. Both performance-based culture and religiosity demonstrate a positive and statistically significant effect across all outcomes, suggesting that individuals who prioritize achievement and who hold stronger religious beliefs are more inclined to express social entrepreneurial intentions, feel more capable in related domains, and have greater engagement in socially oriented activities. In contrast, age consistently shows a negative association, indicating that younger individuals tend to score higher on these measures. These patterns underscore the relevance of motivational and demographic factors in shaping various dimensions of social entrepreneurial engagement.

6. Conclusions

This deliverable has provided an in-depth analysis of the diverse socio-economic, psychological, and behavioural factors underpinning social entrepreneurship related to circular bioeconomy within selected European regions. The study reveals significant insights into how psychological elements, particularly self-confidence and intrinsic motivation, shape social entrepreneurial intentions. Notably, self-efficacy emerged as a key predictor, with younger individuals exhibiting strong motivation and feeling a heightened sense of responsibility to address sustainability challenges within the circular bioeconomy, suggesting that targeted confidence-building initiatives and tailored mentorship should be directed to this age group. This suggests that the emerging generation increasingly views sustainable entrepreneurship as both an opportunity and an ethical imperative, highlighting the potential role of social entrepreneurship in driving ecological and social transformations.

The analysis also uncovered a strong, consistent relationship between regional poverty rates and social entrepreneurial intention to accelerate circular and inclusive bioeconomy transitions. Regions with higher poverty rates demonstrate greater inclination towards social entrepreneurship, indicating that concentrating funding and streamlined administrative support in these areas can maximise impact. Visualization and regression analyses illustrated clearly that areas with higher poverty rates—often characterized by limited industrial development and significant agricultural reliance—demonstrate a greater inclination towards social entrepreneurship. Southern regions of Italy provided compelling examples of this trend, emphasizing social entrepreneurship as a grassroots response to systemic economic and institutional gaps. In such contexts, social enterprises can not only create employment opportunities but also address pressing social needs, showcasing community resilience and agency.

Furthermore, the intersection between agriculture and social entrepreneurship has emerged as a promising avenue for revitalizing rural economies. Initiatives such as community-supported agriculture, sustainable farming practices, and cooperative business models can effectively address local food security, environmental sustainability, and economic revitalization. These entrepreneurial activities not only meet immediate community needs but also help foster inclusive innovation, empowering marginalized communities and small-scale producers.

Drawing from these comprehensive findings, several recommendations emerge. Policymakers could consider enhancing local and institutional support structures, such as providing accessible seed funding, tailored mentorship, and simplified administrative processes, particularly in economically disadvantaged and rural regions. Additionally, public campaigns and community initiatives could help cultivate supportive social norms around personal responsibility and entrepreneurial risk-taking, particularly among younger populations. In this context, MTFs may serve a dual role, both as

institutional support mechanisms and as facilitators of a supportive entrepreneurial culture within the engaged communities.

Educational institutions can play a crucial role by embedding practical experiences and mentorship opportunities into their programs, nurturing essential skills and confidence in future bioeconomy related social entrepreneurs. Collaborative efforts among local stakeholders—business incubators, investors, and community organizations—could strengthen the broader bioeconomy entrepreneurial ecosystem, enabling more effective resource sharing and community-driven support networks.

Overall, the findings confirm that social entrepreneurship in the circular bioeconomy flourishes where local needs are acute, resources are scarce, and confident young changemakers are present. Regions facing high poverty levels show the strongest grassroots energy, while urban centres contribute a pool of well-educated, highly motivated youth ready to launch new ventures. Building on this evidence, the project's next steps will translate today's analysis into practical, region-specific actions that advance an inclusive and sustainable bioeconomy across Europe.

7. References

- Aaron D. Arndt, John B. Ford, Barry J. Babin, Vinh Luong, Collecting samples from online services: How to use screeners to improve data quality, *International Journal of Research in Marketing*, Volume 39, Issue 1, 2022, Pages 117-133, ISSN 0167-8116, <https://doi.org/10.1016/j.ijresmar.2021.05.001>.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211.
- Angelidou, M., & Mora, L. (2019). Developing Synergies Between Social Entrepreneurship and Urban Planning: Evidence from Six European Cities. *disP - The Planning Review*, 55(4), 28–45. <https://doi.org/10.1080/02513625.2019.1708068>.
- Austin, J., Stevenson, H., & Wei-Skillern, J. (2006). Social and commercial entrepreneurship: Same, different, or both? *Entrepreneurship Theory and Practice*, 30(1), 1–22.
- Bacq, S., & Alt, E. (2018). Feeling capable and valued: A prosocial perspective on the link between empathy and social entrepreneurial intentions. *Journal of Business Venturing*, 33(3), 333–350.
- Bamberger, M., Rugh, J., Church, M., & Fort, L. (2004). Shoestring Evaluation: Designing Impact Evaluations under Budget, Time and Data Constraints. *American Journal of Evaluation*, 25(1), 5-37. <https://doi.org/10.1177/109821400402500102>.
- Bamberger M., (2000). "Integrating Quantitative and Qualitative Research in Development Projects," World Bank Publications - Books, The World Bank Group, number 15253. <https://doi.org/10.1596/0-8213-4431-5>.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84(2), 191–215.
- Bargain, O., Barslund, M., & Tiongson, E. R. (2017). The weight of social capital: Networks and access to public services in Ghana. *Journal of Development Studies*, 53(12), 2092–2108.
- Bornstein, D. (2004). *How to Change the World: Social Entrepreneurs and the Power of New Ideas*. Oxford University Press.
- Borzaga, C., Galera, G., & Nogales, R. (2012). Promoting the understanding of cooperatives for a better world. *International Labour Organization Discussion Paper*.
- Cohen, J., Cohen, P., West, S.G., & Aiken, L.S. (2003). *Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences* (3rd ed.). Routledge
- Danis, W. M., De Clercq, D., & Petricevic, O. (2011). Are social networks more important for new business activity in emerging than developed economies? *Journal of Business Venturing*, 26(3), 232–247.
- Davidson-Hunt, I.J., Turner, K.L., Meis Mason, A.H., Anderson, R.B., Dana, L.P. (2012). Inuit culture and opportunity recognition for commercial caribou harvests in the bioeconomy. *Journal of Enterprising Communities*, 6(3), 194–212.

- Dees, J. G. (1998). The meaning of social entrepreneurship. Kauffman Center for Entrepreneurial Leadership.
- Devaney, L., & Iles, A. (2019). Scales of progress, power and potential in the US bioeconomy. *Journal of Cleaner Production*, 233, 379–389.
- Ehrenfeld, W., & Kropfhäuser, F. (2017). Plant-based bioeconomy in Central Germany. *Technology Analysis & Strategic Management*, 29(5), 514–527.
- Erpf, P., Tekula, R., Neuenschwander, J. (2019). Social innovations in response to social challenges: Case studies from Austria. *European Public & Social Innovation Review*, 4(2), 51–64.
- European Commission. (2012). *Innovating for Sustainable Growth: A Bioeconomy for Europe*. Brussels.
- Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2009). Statistical power analyses using G* Power 3.1: Tests for correlation and regression analyses. *Behavior research methods*, 41(4), 1149–1160.
- Festel, G., & Rammer, C. (2015). Importance of venture capital investors for the industrial biotechnology industry. *Journal of Commercial Biotechnology*, 21(1), 31–42.
- Festel, G., & Rittershaus, P. (2014). Fostering technology transfer in industrial biotechnology by academic spin-offs in Europe. *Journal of Commercial Biotechnology*, 20(1), 5–10.
- Forster, F., & Grichnik, D. (2013). Social entrepreneurial intention formation: A case-based causal chain analysis. *Journal of Social Entrepreneurship*, 4(2), 115–135.
- Giurca, A., & Späth, P. (2017). A forest-based bioeconomy for Germany? *Journal of Cleaner Production*, 153, 51–62.
- Global Bioeconomy Summit. (2018). *Communiqué: Global Bioeconomy Summit*. Berlin.
- Goetz, J. L., Keltner, D., & Simon-Thomas, E. (2010). Compassion: An evolutionary analysis and empirical review. *Psychological Bulletin*, 136(3), 351–374.
- Hemingway, C. A. (2005). Personal values as a catalyst for corporate social entrepreneurship. *Journal of Business Ethics*, 60(3), 233–249.
- Hockerts, K. (2017). Determinants of social entrepreneurial intentions. *Entrepreneurship Theory and Practice*, 41(1), 105–130.
- Hockerts, Kai. (2015). The Social Entrepreneurial Antecedents Scale (SEAS): a validation study. *Social Enterprise Journal*. 11. 260-280.
- Hopp, C., & Stephan, U. (2012). The influence of socio-cultural environments on the performance of nascent entrepreneurs: Community culture, motivation, self-efficacy and start-up success. *Entrepreneurship & Regional Development*, 24(9–10), 917–945.
- Kannampuzha, M. J., & Hockerts, K. (2019). Organizational social entrepreneurship: Scale development and validation. *Social Enterprise Journal*, 15(3), 290–319.
- Kerlin, J. A. (2010). A comparative analysis of the global emergence of social enterprise. *Voluntas*, 21(2), 162–179.

- Kickul, J., Griffiths, M., & Bacq, B. (2010). The boundary-less classroom, extending social innovation and impact learning to the field. *Journal of Small Business and Enterprise Development*, 17(4), 652–663.
- Krueger, N. F., & Brazeal, D. V. (1994). Entrepreneurial potential and potential entrepreneurs. *Entrepreneurship Theory and Practice*, 18(3), 91–104.
- Kuckertz, A., Berger, E. S. C., & Brändle, L. (2020). Entrepreneurship and the sustainable bioeconomy transformation. *Environmental Innovation and Societal Transitions*, 37, 332–344.
- Lepoutre, J., Justo, R., Terjesen, S., & Bosma, N. (2013). Designing a global standardized methodology for measuring social entrepreneurship activity: The Global Entrepreneurship Monitor social entrepreneurship study. *Small Business Economics*, 40(3), 693–714.
- Linan, F., & Fayolle, A. (2015). A systematic literature review on entrepreneurial intentions. *International Entrepreneurship and Management Journal*, 11(4), 907–933.
- Lortie, J., Castogiovanni, G., & Cox, K. C. (2017). Gender, social salience, and social return expectations in social entrepreneurship. *Journal of Social Entrepreneurship*, 8(2), 219–242.
- Mair, J., & Marti, I. (2006). Social entrepreneurship research: A source of explanation, prediction, and delight. *Journal of World Business*, 41(1), 36–44.
- Mair, J., & Marti, I. (2009). Entrepreneurship in and around institutional voids: A case study from Bangladesh. *Journal of Business Venturing*, 24(5), 419–435.
- Mair, J., & Noboa, E. (2006). Social entrepreneurship: How intentions to create a social enterprise get formed. IESE Working Paper No. 521.
- Martin, P. (2015). Commercialising neurofutures. *BioSocieties*, 10(4), 422–443.
- Mazzucato, M. (2015). *The Entrepreneurial State: Debunking Public vs. Private Sector Myths*. Anthem Press.
- McIntyre N., Quaye E., S., Anning-Dorson T., Lanivich S., Adomako S., (2023). Investigating the impact of religiosity on entrepreneurial intentions, *Journal of Business Research*, Volume 156, 113528
- Millenbah, K. F., & Millspaugh, J. J. (2003). Using experiential learning in wildlife courses to improve retention, problem solving, and decision-making. *Wildlife society bulletin*, 127-137.
- Miller, T. L., Grimes, M. G., McMullen, J. S., & Vogus, T. J. (2012). Venturing for others with heart and head. *Academy of Management Review*, 37(4), 616–640.
- Neimark, B. D. (2016). Biofuel imaginaries and private sector development in Madagascar. *Journal of Rural Studies*, 45, 146–156.
- Nicholls, A. (2006). *Social Entrepreneurship: New Models of Sustainable Social Change*. Oxford University Press.
- Niezink, L.W., Siero, F.W., Dijkstra, P., Buunk, A.P., Barelds, D.P. (2012). Empathic concern: Distinguishing affective and cognitive empathy. *Personality and Individual Differences*, 52(2), 249–254. OECD, REGPAT database, January 2024

- Nosek B.A., Hardwicke T.E., Moshontz H., Allard A., Corker K.S., Dreber A., Fidler F., Hilgard J., Struhl M. K., Nuijten M., B., Rohrer J. M., Romero F., Scheel A. M., Scherer L. D., Schönbrodt F. D., and, Vazire S., Replicability, robustness, and reproducibility in psychological science. *Annual Review of Psychology*, 73 (1) (2022), pp. 719-748 <https://doi.org/10.1146/annurev-psych-020821-114157>.
- Preston, S. D., Bechara, A., Damasio, H., Grabowski, T. J., Stansfield, R. B., Mehta, S., & Damasio, A. R. (2007). The neural substrates of cognitive empathy. *Social Neuroscience*, 2(3–4), 254–275.
- Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology*, 25(1), 54–67.
- Sabaheta Ramcilovic-Suominen, Helga Pülzl (2018), Sustainable development – A ‘selling point’ of the emerging EU bioeconomy policy framework?, *Journal of Cleaner Production*, 172, 4170-4180.
- Santos, F. M. (2012). A positive theory of social entrepreneurship. *Journal of Business Ethics*, 111(3), 335–351.
- Silvestre, B. S. (2015). Sustainable supply chain management in emerging economies. *Journal of Cleaner Production*, 91, 327–336.
- Sousa-Filho, J. M., Matos, S., Trajano, S. S., & Lessa, B. S. (2020). Determinants of social entrepreneurial intentions in a developing country context. *Journal of Business Venturing Insights*, 14, e00207.
- Van Lancker, J., Wauters, E., & Van Huylenbroeck, G. (2016). Managing innovation in the bioeconomy. *Biomass and Bioenergy*, 90, 60–69.
- Vivien, F.D., Nieddu, M., Befort, N., Debref, R., Giampietro, M. (2019). The hijacking of the bioeconomy. *Ecological Economics*, 159, 189–197.
- Webb, J.W., Bruton, G.D., Tihanyi, L., Ireland, R.D., 2013. Research on entrepreneurship in the informal economy: framing a research agenda. *J. Bus. Ventur.* 28 (5), 598–614.
- Wevers, H. T., Curseu, P. L., & Voinea, C. L. (2024). The implications of the EU cohesion policy instruments and cross-border cooperation projects on social entrepreneurship in Euroregions. *Innovation: The European Journal of Social Science Research*, 38(1), 280–300. <https://doi.org/10.1080/13511610.2024.2403455>.
- Yamini, R., Soloveva, D., & Peng, X. (2020). What inspires social entrepreneurship? The role of prosocial motivation, intrinsic motivation, and gender in forming social entrepreneurial intention. *Entrepreneurship Research Journal*, 12(2), 71–105.
- Zahra, S. A., Gedajlovic, E., Neubaum, D. O., & Shulman, J. M. (2009). A typology of social entrepreneurs. *Journal of Business Venturing*, 24(5), 519–532.
- Zhao, H., Seibert, S. E., & Hills, G. E. (2005). The mediating role of self-efficacy in the development of entrepreneurial intentions. *Journal of Applied Psychology*, 90(6), 1265–1272.

8. Annex

8.1 Annex I – Survey Questionnaire

The survey questionnaire was developed in English and was translated in the native languages of the 4 countries (Italy, Greece, Romania, Poland). The design of the questionnaire followed the guidelines of WP6, ensuring full GDPR compliance. Below the English version is presented, while the translated questionnaires can be found [here](#):

Welcome note

Dear participant, welcome to our survey!

The survey lasts approximately 15 minutes. There are no right or wrong answers, this is about your views. All data will be anonymised, and your privacy is guaranteed.

Thank you for helping us gather relevant information!

What is RIBES all about?

RIBES is 3-year project funded by the EU. The project is helping ten European regions move away from outdated, linear economic models toward sustainable, inclusive circular economies that benefit everyone. It brings together rural communities, universities, governments, and businesses to work as

partners and design new ways for local governments, enterprises and communities to grow inclusively and sustainably.

Description

This survey explores what drives people to become social entrepreneurs, those who create solutions for social challenges. We are studying how factors like background, values, and interests shape social innovation for the bioeconomy sector.

Thank you for participating!

Definitions

A **social entrepreneur** is an individual who develops and implements innovative solutions to address social, cultural, or environmental challenges. Unlike traditional entrepreneurs, whose primary goal is profit, social entrepreneurs focus on creating positive societal impact while maintaining financial sustainability. They apply business principles, creativity, and leadership to solve pressing issues such as poverty, education, healthcare, and environmental sustainability.

The **bioeconomy** refers to an economic system that uses renewable biological resources—such as crops, forests, fish, and microorganisms—to produce food, materials, energy, and other sustainable solutions. It integrates science, technology, and innovation to reduce reliance on fossil fuels, promote environmental sustainability, and support economic growth. Bioeconomy offers opportunities for **social entrepreneurs** by providing sustainable resources and innovative business models that can drive economic and social benefits for communities.

RISKS AND BENEFITS

There are no known risks associated with this study.

Participant's Rights

If you have read this form and have decided to participate in this project, please understand your participation is voluntary and you have the right to discontinue participation at any time without penalty or loss of benefits to which you are otherwise entitled. You have the right to refuse to answer particular questions. Your individual privacy will be maintained in all published and written data resulting from the study.

Contact Information

If you have any questions concerning this privacy policy or our data collection practices, you may contact us at info@ribesproject.eu. We reserve the right to change this privacy policy at any time and inform all participants about the updates.

In addition to your opinion, we are collecting some personal information such as Age, Gender, Area of residence, Educational status and Net Annual Household Income for socio-demographic purposes. The collected data will be saved and used until the end of the research period of the RIBES project (28/02/2027). The data will be only used for the purpose of the RIBES project, funded under the European Union Horizon Europe programme (Grant Agreement no. 101134911).

The lawfulness of the processing of personal data is determined pursuant to Article 6 of the EU's General Data Protection Regulation (GDPR). With respect to personal data, the processing of personal data is based on consent. White Research will be responsible for accessing and processing the data.

If you have read the information above and would like to participate in the study, please click "I consent."

Alternatively, if you do not want to complete the study, please click "I do not consent" and you will be redirected to the end of the study.

- ☐ I consent
- ☐ I do not consent

SOCIAL ENTREPRENEURIAL INTENTION

(Five-point scale from "strongly disagree » to "strongly agree")

Q1. I expect that at some point in the future I will be involved in launching an organization that aims to solve social problems.

1 (strongly disagree)	2	3	4	5 (strongly agree)
☐	☐	☐	☐	☐

Q2. I have a preliminary idea for a social enterprise on which I plan to act in the future.

1 (strongly disagree)	2	3	4	5 (strongly agree)
☐	☐	☐	☐	☐

Q3. I do not plan to start a social enterprise.

1 (strongly disagree)	2	3	4	5 (strongly agree)
☐	☐	☐	☐	☐

SOCIAL ENTREPRENEURIAL SELF-EFFICACY

(Five-point scale from "strongly disagree » to "strongly agree")

Q4. I am convinced that I personally can make a contribution to address societal challenges if I put my mind to it.

1 (strongly disagree)	2	3	4	5 (strongly agree)
☐	☐	☐	☐	☐

Q5. I could figure out a way to help solve the problems that society faces.

1 (strongly disagree)	2	3	4	5 (strongly agree)
☐	☐	☐	☐	☐

Q6. Solving societal problems is something each of us can contribute to.

1 (strongly disagree)	2	3	4	5 (strongly agree)
☐	☐	☐	☐	☐

SOCIAL ENTREPRENEURIAL SELF-EFFICACY FOR BIOECONOMY

Social entrepreneurship can drive initiatives that enable people and local communities to benefit from the bioeconomy through income generation, food production, energy access, innovative products, and sustainable solutions. A sustainable bioeconomy can support regions and local communities in advancing toward an inclusive, circular, and low-carbon economy. In this context, please answer the following questions.

(Five-point scale from “strongly disagree » to “strongly agree”)

Q7. I am convinced that I personally can make a contribution to address inclusive and circular bioeconomy challenges if I put my mind to it.

1 (strongly disagree)	2	3	4	5 (strongly agree)
☐	☐	☐	☐	☐

Q8. I could figure out a way to help solve the inclusive and circular bioeconomy problems that society faces.

1 (strongly disagree)	2	3	4	5 (strongly agree)
☐	☐	☐	☐	☐

☐	☐	☐	☐	☐
--------------------------	--------------------------	--------------------------	--------------------------	--------------------------

Q9. Solving the inclusive and circular bioeconomy problems is something each of us can contribute to.

1 (strongly disagree)	2	3	4	5 (strongly agree)
☐	☐	☐	☐	☐

PRIOR EXPERIENCE

(Five-point scale from “strongly disagree » to “strongly agree”)

Q10. I have some experience working with social problems.

1 (strongly disagree)	2	3	4	5 (strongly agree)
☐	☐	☐	☐	☐

Q11. I have volunteered or otherwise worked with social organizations.

1 (strongly disagree)	2	3	4	5 (strongly agree)
☐	☐	☐	☐	☐

Q12. I know a lot about social organizations.

1 (strongly disagree)	2	3	4	5 (strongly agree)
☐	☐	☐	☐	☐

Q13. I have experience in the bioeconomy sector

1 (strongly disagree)	2	3	4	5 (strongly agree)
☐	☐	☐	☐	☐

This question is to check your attention only. When asked about your favourite drink, please select “orange juice”.

Based on the text you read above, what is your favourite drink?

- ☐ Beer
- ☐ Wine
- ☐ Tea
- ☐ Coffee
- ☐ Orange juice
- ☐ Apple juice

Barriers within the circular bioeconomy sector

Q14. What are the biggest challenges in social innovation within the circular bioeconomy sector? (Select all that apply – Answer Yes or No for each)

Statement	Yes	No
Lack of awareness and understanding among the public		
Insufficient financial support (grants, loans, incentives)		
Weak government policies and regulations		
Limited collaboration between businesses, researchers, and policymakers		
Inadequate recycling and waste management infrastructure		
Low market demand for sustainable products		
Resistance to change from businesses and consumers		
Limited availability of skilled professionals in the sector		

Q15. Which of the following could help address the challenges related to social innovation and promote the development of a circular bioeconomy in your region? (Please answer Yes or No for each option)

Statement	Yes	No
Increasing public education and awareness campaigns		
Providing financial support for businesses and startups		
Developing stronger government policies and regulations		
Encouraging collaboration between universities, businesses, and policymakers		

Investing in better recycling and waste management infrastructure		
Offering incentives for consumers to buy sustainable products		
Supporting training programs to build expertise in the sector		
Increasing public education and awareness campaigns		

IMPLICIT MOTIVATION

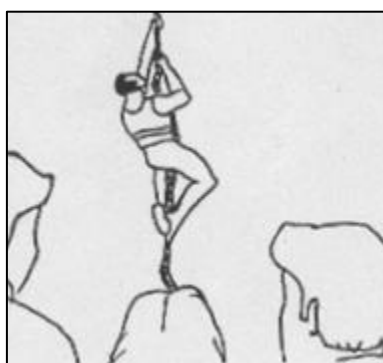
All people find themselves in various, ever-changing life situations on a daily basis. As situations change, thoughts and feelings naturally shift as well. It is well known that individuals differ significantly in this regard, particularly in their willingness to engage in social situations.

Below, you will see several images, each accompanied by a set of statements. Each image represents an everyday life situation. The images are deliberately somewhat unclear, so try to let your imagination run free and put yourself in the role of any person in the image.

Under each image, you will find a series of thoughts, feelings, and experiences that one might have in that situation. Please evaluate each statement individually to determine whether it applies to the given situation or not, and then tick the box for “yes” or “no.” Try not to overthink—follow your spontaneous impression.

Once you have answered all the statements for one image, move on to the next.

Q16.



Statement	Yes	No
Feeling good about meeting other people.		
Anticipating to lose standing.		
Thinking about lacking abilities at this task.		
Being afraid of being overpowered by other people.		
Wanting to postpone a difficult task for a while.		

Hoping to get in touch with other people by taking the initiative oneself.		
Hoping to acquire a good standing		

Q17.



Statement	Yes	No
Anticipating to lose standing.		
Feeling confident to succeed at this task.		
Being afraid of being rejected by others.		
Thinking about lacking abilities at this task.		
Being afraid of being overpowered by other people.		
Being afraid of being boring to others.		

Q18.



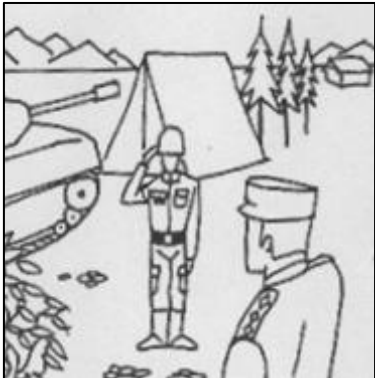
Statement	Yes	No
Feeling good about meeting other people.		
Anticipating to lose standing.		
Thinking about lacking abilities at this task.		
Being afraid of being overpowered by other people.		
Wanting to postpone a difficult task for a while.		
Hoping to get in touch with other people by taking the initiative oneself.		

Q19.



Statement	Yes	No
Feeling confident to succeed at this task.		
Being afraid of being rejected by others.		
Thinking about lacking abilities at this task.		
Feeling good about one's competence		
Being afraid of being boring to others.		
Wanting to postpone a difficult task for a while.		
Hoping to acquire a good standing		

Q20.



Statement	Yes	No
Feeling good about meeting other people.		
Anticipating to lose standing.		
Being afraid of being rejected by others.		
Thinking about lacking abilities at this task.		
Being afraid of being overpowered by other people.		
Wanting to postpone a difficult task for a while.		
Hoping to get in touch with other people by taking the initiative oneself.		

Q21.



Statement	Yes	No
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Feeling confident to succeed at this task.		
Being afraid of being rejected by others.		
Thinking about lacking abilities at this task.		
Feeling good about one's competence.		
Being afraid of being boring to others.		
Wanting to postpone a difficult task for a while.		
Trying to influence other people.		

Q22.



Statement	Yes	No
Anticipating to lose standing.		
Feeling confident to succeed at this task.		
Thinking about lacking abilities at this task.		
Feeling good about one's competence.		
Wanting to postpone a difficult task for a while.		
Trying to influence other people		
Hoping to get in touch with other people by taking the initiative oneself.		
Hoping to acquire a good standing		

Q23.



Statement	Yes	No
Feeling good about meeting other people.		
Anticipating to lose standing.		
Feeling confident to succeed at this task.		
Being afraid of being rejected by others.		
Being afraid of being overpowered by other people.		
Feeling good about one's competence		
Being afraid of being boring to others.		
Trying to influence other people		
Hoping to get in touch with other people by taking the initiative oneself.		
Hoping to acquire a good standing		

Q24.



Statement	Yes	No
Anticipating to lose standing.		
Thinking about lacking abilities at this task.		
Being afraid of being overpowered by other people.		
Trying to influence other people		

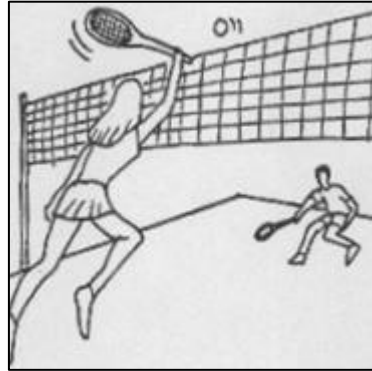
Q25.



Statement	Yes	No
Feeling good about meeting other people.		
Feeling confident to succeed at this task.		
Being afraid of being rejected by others.		
Feeling good about one's competence.		
Being afraid of being boring to others.		

Trying to influence other people.		
Hoping to acquire a good standing.		

Q26.



Statement	Yes	No
Feeling good about meeting other people.		
Feeling confident to succeed at this task.		
Thinking about lacking abilities at this task.		
Feeling good about one's competence.		
Trying to influence other people		
Hoping to get in touch with other people by taking the initiative oneself.		
Hoping to acquire a good standing.		

Q27.



Statement	Yes	No
Feeling confident to succeed at this task.		
Thinking about lacking abilities at this task.		
Feeling good about one’s competence.		
Wanting to postpone a difficult task for a while.		
Trying to influence other people		
Hoping to get in touch with other people by taking the initiative.		
Hoping to acquire a good standing.		

Q28.



Statement	Yes	No
Feeling good about meeting other people.		

Being afraid of being overpowered by other people.		
Trying to influence other people		
Hoping to get in touch with other people by taking the initiative.		
Hoping to acquire a good standing		

Q29.



Statement	Yes	No
Anticipating to lose standing.		
Being afraid of being rejected by others.		
Being afraid of being overpowered by other people.		
Feeling good about one's competence		
Being afraid of being boring to others.		
Hoping to get in touch with other people by taking the initiative.		

Performance-based culture

(Five-point scale from "strongly disagree » to "strongly agree")

Q30. The social norms and culture of the community where you live are highly supportive of success achieved through one's own personal efforts.

1 (strongly disagree)	2	3	4	5 (strongly agree)
☐	☐	☐	☐	☐

Q31. The social norms and culture of your community emphasize self-sufficiency, autonomy and personal initiative.

1 (strongly disagree)	2	3	4	5 (strongly agree)
☐	☐	☐	☐	☐

Q32. The social norms and culture of your community encourage entrepreneurial risk-taking.

1 (strongly disagree)	2	3	4	5 (strongly agree)
☐	☐	☐	☐	☐

Q33. The social norms and culture of your community encourage creativity and innovativeness.

1 (strongly disagree)	2	3	4	5 (strongly agree)
☐	☐	☐	☐	☐

Q34. The social norms and culture of your community emphasize the responsibility that the individual has in managing his or her own life.

1 (strongly disagree)	2	3	4	5 (strongly agree)
☐	☐	☐	☐	☐

Socially supportive institutional environment

(Five-point scale from "strongly disagree » to "strongly agree")

Q35. State and local governments in your community provide good support for those starting new businesses.

1	2	3	4	5
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(strongly disagree)				(strongly agree)
☐	☐	☐	☐	☐

Q36. Bankers and other investors in your community go out of their way to help new businesses get started.

1 (strongly disagree)	2	3	4	5 (strongly agree)
☐	☐	☐	☐	☐

Q37. Community groups provide good support for those starting new businesses.

1 (strongly disagree)	2	3	4	5 (strongly agree)
☐	☐	☐	☐	☐

DEMOGRAPHICS

Q38. Please name the country that you are currently living in.

Q39. Please name the city/town/village that you are currently living in.

Q40. Please indicate your age.

Q41. I live in a

- ☐ Urban Environment
- ☐ Semi-Urban Environment
- ☐ Rural Environment

Q42. Please indicate your gender.

- ☐ Male
- ☐ Female
- ☐ Non-binary
- ☐ Prefer not to say

Q43. Please indicate the highest level of education you have attained.

- ☐ Did Not Complete
- ☐ High School/GED
- ☐ Some College
- ☐ Bachelor's Degree
- ☐ Master's Degree
- ☐ Advanced Graduate work or Ph.D.

Q44. Please indicate your current Net Annual Household Income (in Euros).

- ☐ €5.000 or less
- ☐ €5.001 - €15.000
- ☐ €15.001 - €25.000
- ☐ €25.001 - €35.000
- ☐ €35.001 - €45.000
- ☐ €45.001 - €55.000
- ☐ €55.001 - €65.000
- ☐ €65.001 - €75.000
- ☐ €75.001 or more

Q45. Please indicate your Net Annual Household Income (in Euros) when you were growing up.

- ☐ €5.000 or less
- ☐ €5.001 - €15.000
- ☐ €15.001 - €25.000
- ☐ €25.001 - €35.000
- ☐ €35.001 - €45.000
- ☐ €45.001 - €55.000
- ☐ €55.001 - €65.000
- ☐ €65.001 - €75.000
- ☐ €75.001 or more

Q46. Do you feel you are part of the same race or ethnic group as most people in [region/country]?

Q47. Regardless of whether you belong to a particular religion, how religious would you say you are?

0 Not at all religious	1	2	3	4	5	6	7	8	9	10 Very religious
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☐ I prefer not to answer

☐ I don't know

Q48. In politics, people sometimes talk of 'left' and 'right'. Where would you place yourself on this scale, where 0 means 'Left' and 10 means 'Right'?

0 Left	1	2	3	4	5	6	7	8	9	10 Right
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☐ I prefer not to answer

☐ I don't know

8.2 Annex II

Perceptions of Social Innovation - Challenges and Solutions

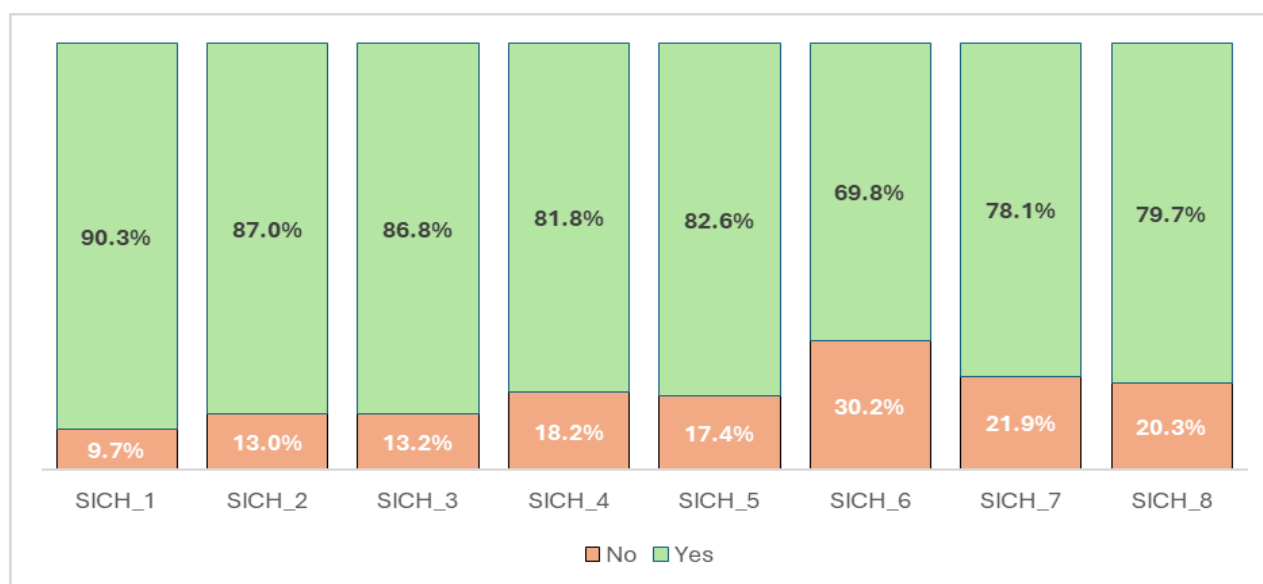
This subsection examines participants' perceptions of key challenges and potential solutions related to social innovation, particularly within the context of the circular bioeconomy. The descriptive analysis provides insights into which barriers citizens perceive as most pressing and which strategies they believe are most promising to address these issues.

Perceived Challenges in Social Innovation (SICH) were assessed using eight items that captured a range of systemic barriers, including lack of public awareness, insufficient financial resources, weak government policies, limited cross-sector collaboration, inadequate infrastructure, low market demand, resistance to change, and shortages of skilled professionals. Participants were asked to indicate whether they agreed that each represented a challenge (yes = 1, no = 0).

The descriptive results show that these barriers were widely recognised across the sample, with agreement rates ranging from nearly 70% to over 90%. The most frequently endorsed challenge was the **lack of public awareness and understanding** (90.3% agreement), followed by **insufficient financial support** (87.0%) and **weak government policies and regulations** (86.8%). Other commonly identified barriers included **inadequate recycling and waste management infrastructure** (82.6%), **limited collaboration between businesses, researchers, and policymakers** (81.8%), and **shortages of skilled professionals** (79.7%). Interestingly, **low market demand for sustainable products** was viewed as a less pressing issue, though still acknowledged by 69.8% of respondents.

Table 29. Perceived Challenges in Social Innovation

Variable	Question	No	Yes
SICH_1	Lack of awareness and understanding among the public	9.7%	90.3%
SICH_2	Insufficient financial support (grants, loans, incentives)	13.0%	87.0%
SICH_3	Weak government policies and regulations	13.2%	86.8%
SICH_4	Limited collaboration between businesses, researchers, and policymakers	18.2%	81.8%
SICH_5	Inadequate recycling and waste management infrastructure	17.4%	82.6%
SICH_6	Low market demand for sustainable products	30.2%	69.8%
SICH_7	Resistance to change from businesses and consumers	21.9%	78.1%
SICH_8	Limited availability of skilled professionals in the sector	20.3%	79.7%

**Figure 19. Perceived Challenges in Social Innovation answers' distribution**

Perceived Solutions to Address Challenges (SIACH) were measured with eight items assessing support for possible interventions, including education campaigns, financial and consumer incentives, regulatory improvements, cross-sector collaboration, infrastructure upgrades, and skills training. The results revealed exceptionally high levels of endorsement, with agreement rates across items ranging from 85.1% to 89.3%. The most strongly supported measures were **increasing public education and awareness campaigns** (89.3%) and **investing in better recycling and waste management infrastructure** (88.3%), closely followed by **providing financial support for businesses and startups** (88.0%) and

offering incentives for consumers to buy sustainable products (87.2%). Other widely supported actions included **developing stronger government policies** (85.1%) and **supporting training programmes to build sector expertise** (86.8%).

Table 30. Perceived Solutions to Address Challenges

Variable	Question	No	Yes
SIACH_1	Increasing public education and awareness campaigns	10.7%	89.3%
SIACH_2	Providing financial support for businesses and startups	12.0%	88.0%
SIACH_3	Developing stronger government policies and regulations	14.9%	85.1%
SIACH_4	Encouraging collaboration between universities, businesses, and policymakers	13.4%	86.6%
SIACH_5	Investing in better recycling and waste management infrastructure	11.7%	88.3%
SIACH_6	Offering incentives for consumers to buy sustainable products	12.8%	87.2%
SIACH_7	Supporting training programs to build expertise in the sector	13.2%	86.8%
SIACH_8	Increasing public education and awareness campaigns	11.9%	88.1%

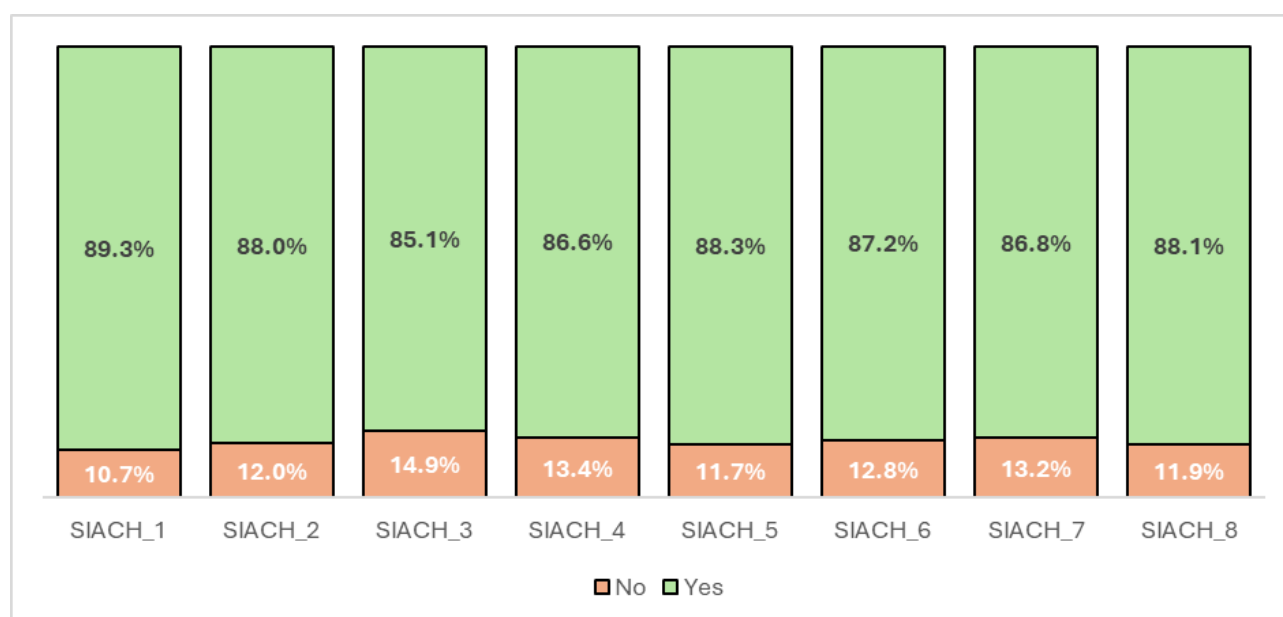


Figure 20. Perceived Solutions to Address Challenges answers' distribution

Overall, these findings demonstrate a clear and widespread recognition among European citizens of the key systemic challenges facing social innovation in the bioeconomy sector, along with broad-based support for a range of policy, financial, and educational interventions. This consensus highlights the potential readiness of local communities to engage with targeted strategies to overcome barriers to sustainable and inclusive innovation.

Perceived Challenges (PC) and Perceived Solutions and Strategies (PSS)

The **PC variable** aggregates responses to eight key challenges, yielding a mean score of 6.56 (out of 8), a median of 7, and a standard deviation of 1.68. This high average indicates broad agreement on the presence of systemic barriers, with particularly strong concern about public awareness, financial constraints, and policy weaknesses. The distribution showed negative skewness (-1.24), highlighting the widespread consensus around these challenges.

The **PSS variable** summarises endorsement of eight possible solutions, with a mean score of 6.99 (out of 8), a median of 8, and a standard deviation of 1.71. This reflects near-universal support for interventions such as public education campaigns, financial support, and cross-sector collaboration. The skewness of -1.92 confirms the strong collective appetite for action across the sample.

Age

Perceived challenges (PC) and support for solutions (PSS) tended to increase with age, peaking among the 65+ group (PC = 7.00, PSS = 7.50). This suggests that older respondents are more aware of systemic barriers and more strongly support addressing them, possibly reflecting accumulated experience or heightened concern for future generations.

Table 31. Age Differences in PC and PSS Scores

Age group	PC	PSS
18-24	5.88 (±1.73)	6.13 (±1.97)
25-34	6.08 (±1.81)	6.48 (±1.88)
35-44	6.58 (±1.71)	7.00 (±1.65)
45-54	6.78 (±1.57)	7.24 (±1.57)
55-64	6.89 (±1.51)	7.40 (±1.49)
65+	7.00 (±1.42)	7.50 (±1.18)

Gender

Women reported slightly higher PC (6.72) and PSS (7.15) scores than men (PC = 6.39; PSS = 6.84), indicating greater sensitivity to structural barriers and a stronger endorsement of remedial actions.

Table 32. PC and PSS Scores by Gender Identity

Gender	PC	PSS
Female	6.72 (± 1.63)	7.15 (± 1.62)
Male	6.39 (± 1.71)	6.84 (± 1.77)
No response	5.25 (± 3.77)	4.75 (± 3.59)
Non-binary	4.33 (± 0.58)	4.67 (± 0.58)

Environment

Rural residents perceived the most challenges (PC = 6.75) and showed the strongest support for solutions (PSS = 7.14), compared to semi-urban and urban respondents. This highlights the relevance of tailored interventions for rural innovation ecosystems.

Table 33. PC and PSS Scores by Residential Environment

Environment	PC	PSS
Rural	6.75 (± 1.64)	7.14 (± 1.66)
Semi-urban	6.43 (± 1.67)	6.88 (± 1.70)
Urban	6.55 (± 1.69)	6.99 (± 1.71)

Education

PSS scores increased slightly with education, with master's degree holders reporting the highest support (PSS = 7.21). Interestingly, PC scores remained relatively stable across education levels, suggesting shared perceptions of challenges regardless of educational background.

Table 34. Differences in PC and PSS by Education Level

Education	PC	PSS
Did Not Complete	6.15 (± 2.11)	6.54 (± 2.37)
High School/GED	6.56 (± 1.72)	6.98 (± 1.76)
Some College	6.55 (± 1.66)	7.03 (± 1.64)
Bachelor's Degree	6.54 (± 1.56)	6.99 (± 1.63)
Master's Degree	6.92 (± 1.59)	7.21 (± 1.46)

**Advanced Graduate work
or Ph.D,**
6.61 (± 1.82)7.03 (± 1.78)
Income

Both PC and PSS remained fairly consistent across income groups, though the lowest and highest income brackets showed slightly elevated PSS scores, indicating that perceived solutions resonate across socio-economic divides.

Table 35. PC and PSS Scores by Annual Income Bracket

Income	PC	PSS
€5,000 or less	6.47 (± 1.88)	6.79 (± 1.98)
€5,001 - €15,000	6.75 (± 1.52)	7.18 (± 1.44)
€15,001 - €25,000	6.51 (± 1.71)	6.96 (± 1.81)
€25,001 - €35,000	6.55 (± 1.65)	6.97 (± 1.67)
€35,001 - €45,000	6.43 (± 1.65)	6.93 (± 1.71)
€45,001 - €55,000	6.57 (± 1.64)	7.24 (± 1.40)
€55,001 - €65,000	6.46 (± 1.62)	6.86 (± 1.66)
€65,001 - €75,000	6.90 (± 1.51)	7.07 (± 1.64)
€75,001 or more	6.33 (± 2.17)	6.97 (± 2.04)

Religiosity

Higher religiosity levels were associated with slightly stronger perceptions of challenges and solutions, particularly among those at the upper end of the religiosity scale (PC = 6.74, PSS = 7.11), pointing to a possible alignment between moral values and social concern.

Table 36. Differences in PC and PSS by Self-Reported Religiosity

Religious	PC	PSS
0	6.61 (± 1.67)	6.99 (± 1.73)
1	6.15 (± 1.84)	6.69 (± 1.90)
2	6.58 (± 1.54)	7.09 (± 1.45)
3	6.46 (± 1.71)	6.98 (± 1.74)

4	6.57 (± 1.67)	6.77 (± 1.83)
5	6.54 (± 1.74)	7.00 (± 1.77)
6	6.40 (± 1.69)	6.89 (± 1.72)
7	6.57 (± 1.65)	7.10 (± 1.53)
8	6.61 (± 1.53)	7.11 (± 1.60)
9	6.74 (± 1.53)	7.11 (± 1.55)
10	6.77 (± 1.71)	7.04 (± 1.83)
I don't know	5.81 (± 2.40)	6.15 (± 2.31)
No response	6.22 (± 2.10)	6.66 (± 2.14)

Political orientation

Respondents on the right (scores 9–10) reported the highest PSS scores (PSS = ~ 6.90 – 6.97), while the political centre and left showed somewhat lower endorsement. This suggests that support for social innovation measures crosses ideological lines, although the motivations may differ.

Table 37. Differences in PC and PSS by Political Identification

Political	PC	PSS
0	6.45 (± 1.90)	6.94 (± 1.80)
1	6.69 (± 1.62)	7.24 (± 1.22)
2	6.71 (± 1.69)	7.05 (± 1.57)
3	6.66 (± 1.63)	7.16 (± 1.51)
4	6.53 (± 1.61)	7.08 (± 1.53)
5	6.60 (± 1.64)	7.03 (± 1.68)
6	6.40 (± 1.56)	6.81 (± 1.72)
7	6.55 (± 1.64)	7.11 (± 1.44)
8	6.58 (± 1.55)	7.03 (± 1.69)
9	6.45 (± 1.62)	6.90 (± 1.74)

10	6.62 (± 1.78)	6.86 (± 2.06)
I don't know	6.39 (± 1.98)	6.81 (± 2.01)
No response	6.57 (± 1.71)	6.94 (± 1.77)

Country differences

Romanian respondents reported the highest PC (6.80) and PSS (7.18) scores, followed by Greece and Italy, with Polish respondents slightly lower. This geographic pattern suggests that national context and institutional maturity may shape both problem recognition and solution endorsement.

Table 38. Country Differences in Perceived Challenges and Support for Solutions

Country	PC	PSS
Greece	6.50 (± 1.63)	7.09 (± 1.49)
Italy	6.47 (± 1.76)	6.86 (± 1.84)
Poland	6.48 (± 1.75)	6.85 (± 1.89)
Romania	6.80 (± 1.57)	7.18 (± 1.57)

Although the variables **Perceived Challenges (PC)** and **Perceived Solutions and Strategies (PSS)** were not included in the later analyses of this deliverable, they offer valuable complementary insights into how citizens perceive the landscape of social innovation across European regions.

8.3 Annex III – Complementary statistical analysis

Summary heat maps

In the following heatmaps, the scores for each construct were normalised to account for the fact that they come from different scales (for example, SEI ranges from 3–15, while PBC ranges from 5–25). Normalisation rescales the values to a common range between 0 and 1, making it possible to compare patterns across constructs fairly within the same visual. This approach highlights relative differences across demographic groups without being skewed by the original scale differences, allowing for clearer, more meaningful interpretation of the data. Darker shades indicate higher normalised values.

Age Group

The heatmap shows normalised scores across six age groups, highlighting trends such as slightly declining SEI and SESE with age, and relatively stable PBC across all groups.

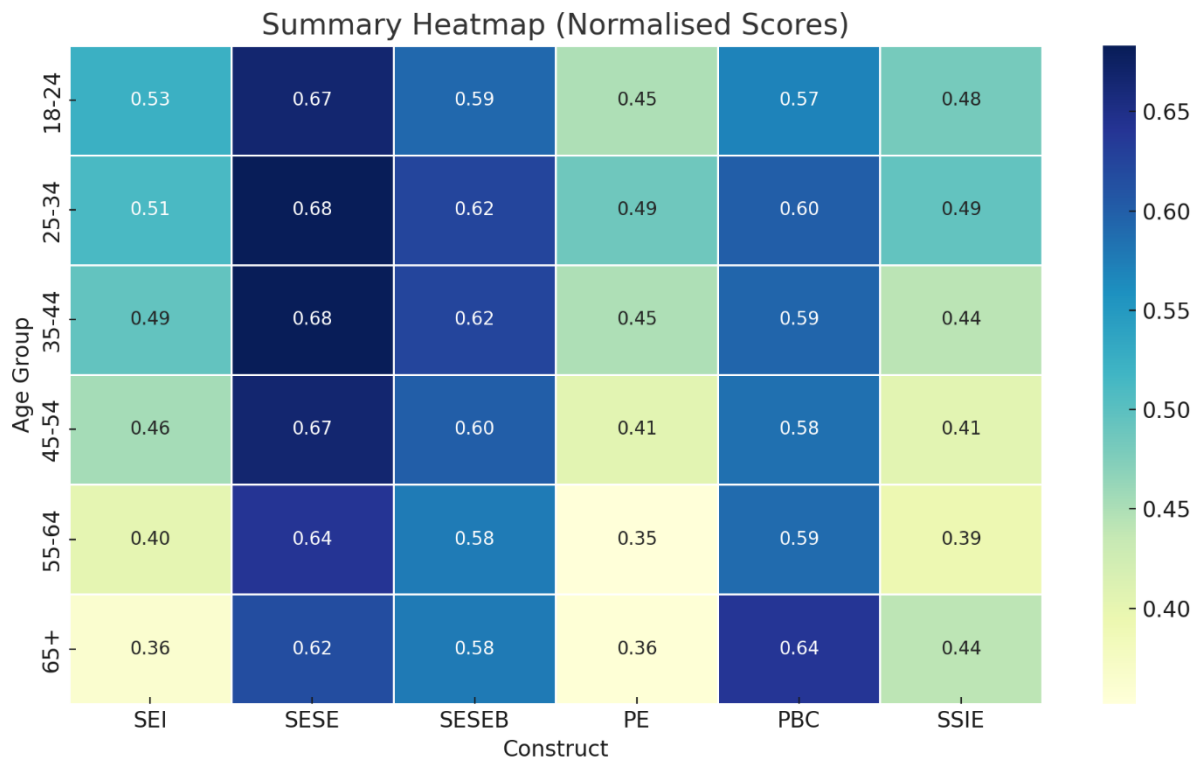


Figure 21. Summary Heatmap by Age Group

Gender

The heatmap compares male and female participants. The differences are subtle, with males generally showing slightly higher normalised scores across most constructs.

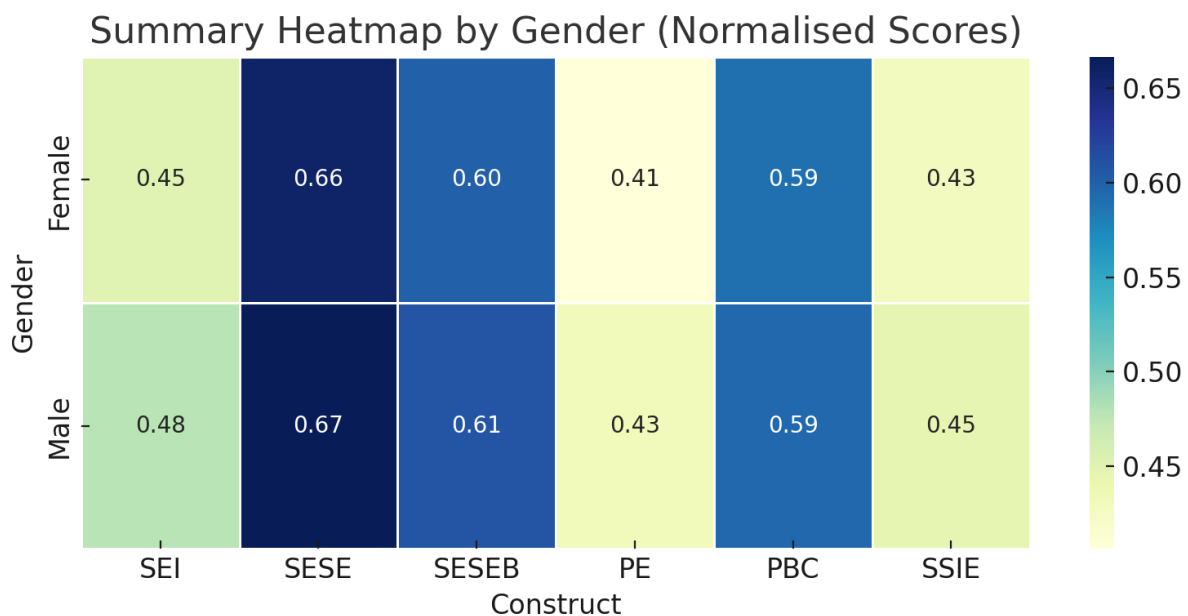


Figure 22. Summary Heatmap by Gender Identity

Environment

This heatmap compares rural, semi-urban, and urban respondents. Urban participants tend to report marginally higher SEI and SESE, while rural respondents score highest on PBC.

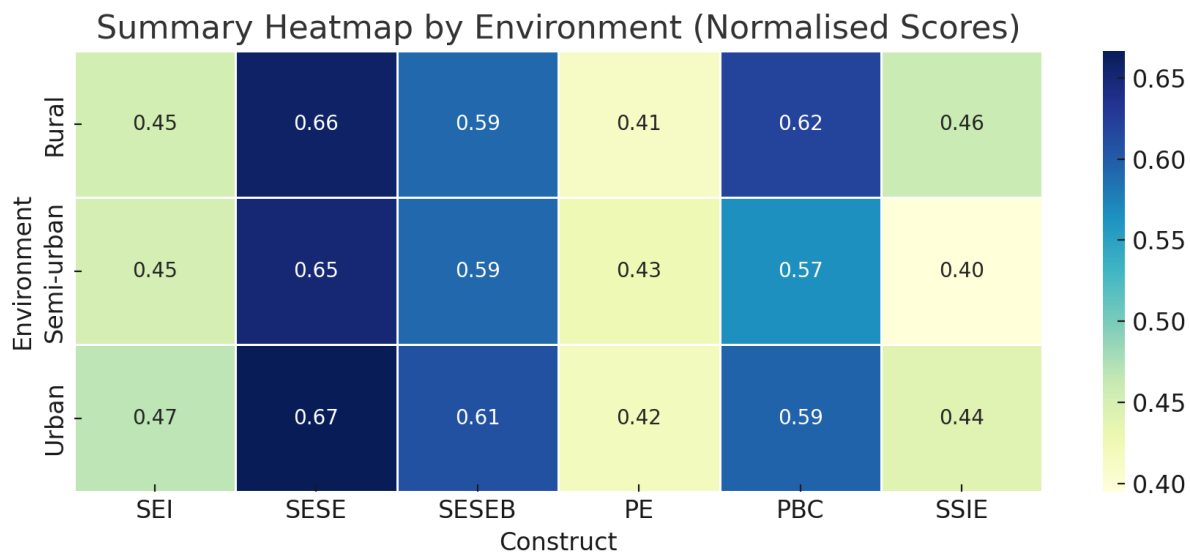


Figure 23. Summary Heatmap by Residential Environment

Education

The heatmap across education levels reveals a trend of increasing scores, especially SEI, SESE, and PE, as educational attainment rises. The highest scores are seen in Master's and PhD holders.

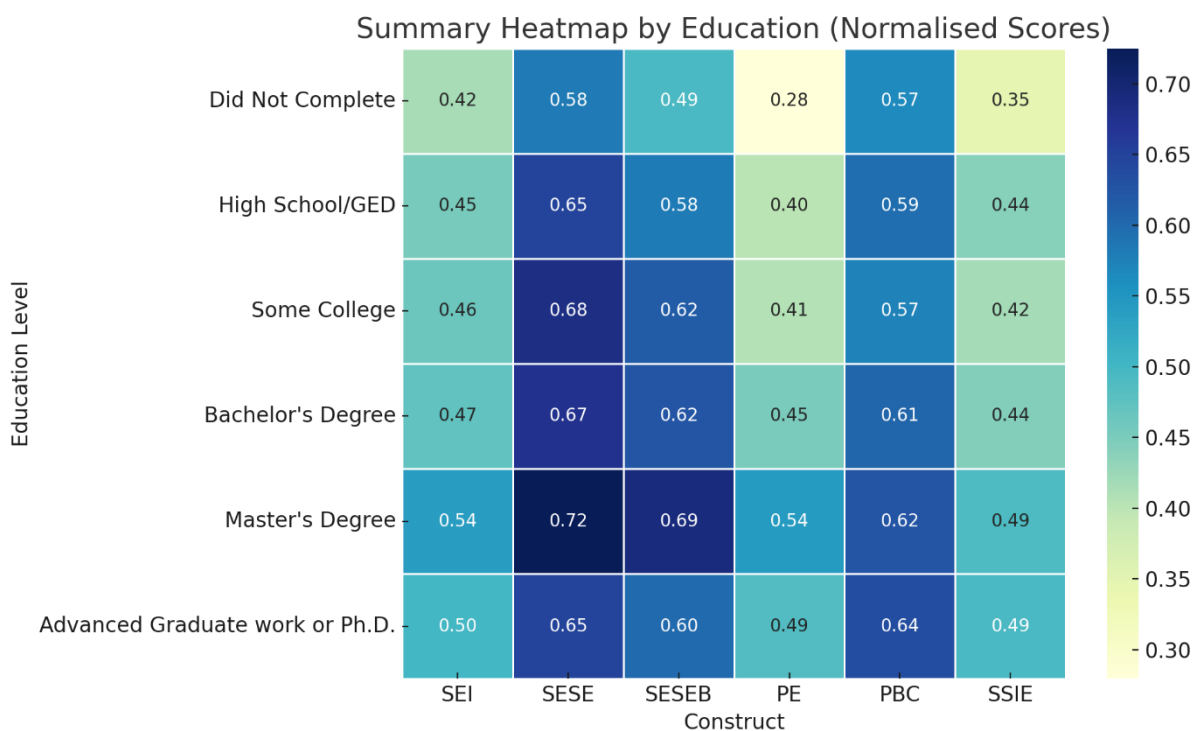


Figure 24. Summary Heatmap by Education Level

Income

The heatmap visualises scores across income brackets. There is a clear upward trend, particularly for SEI, SESE, and PE, as income increases, with the highest scores in the top income bracket.

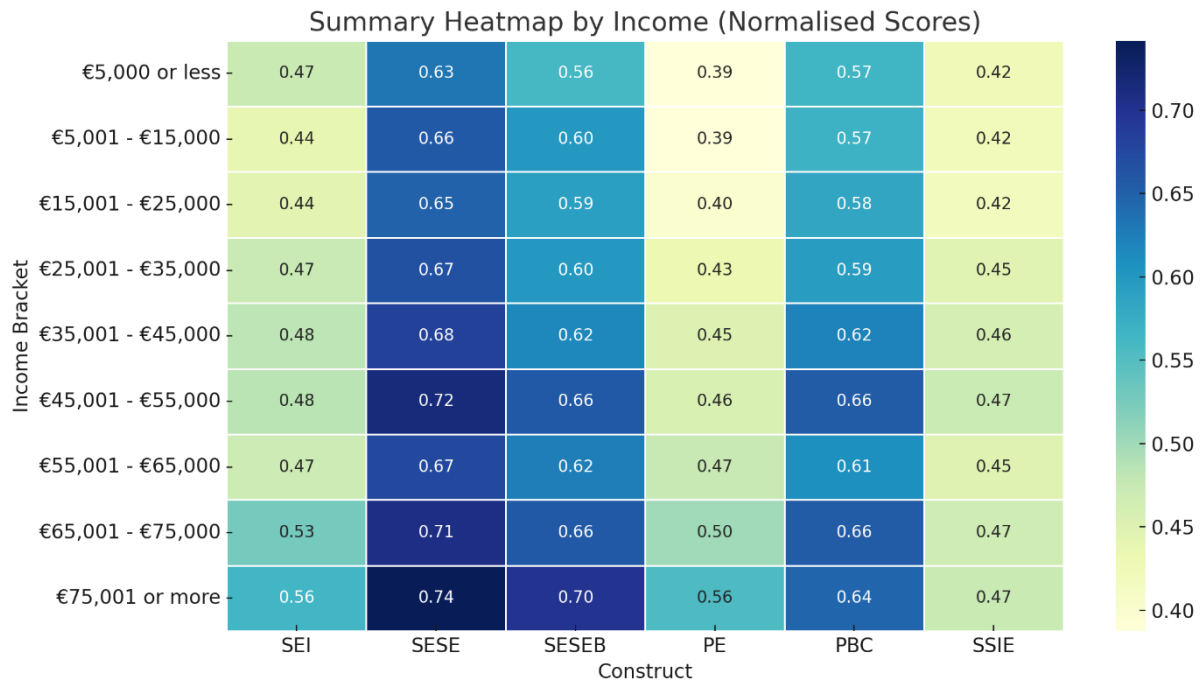


Figure 25. Summary Heatmap by Income Group

Religious Level

This heatmap shows how self-reported religiousness (0–10) relates to the constructs. Generally, higher religiousness is associated with higher scores across most constructs, though “I don’t know” respondents show notably lower levels.

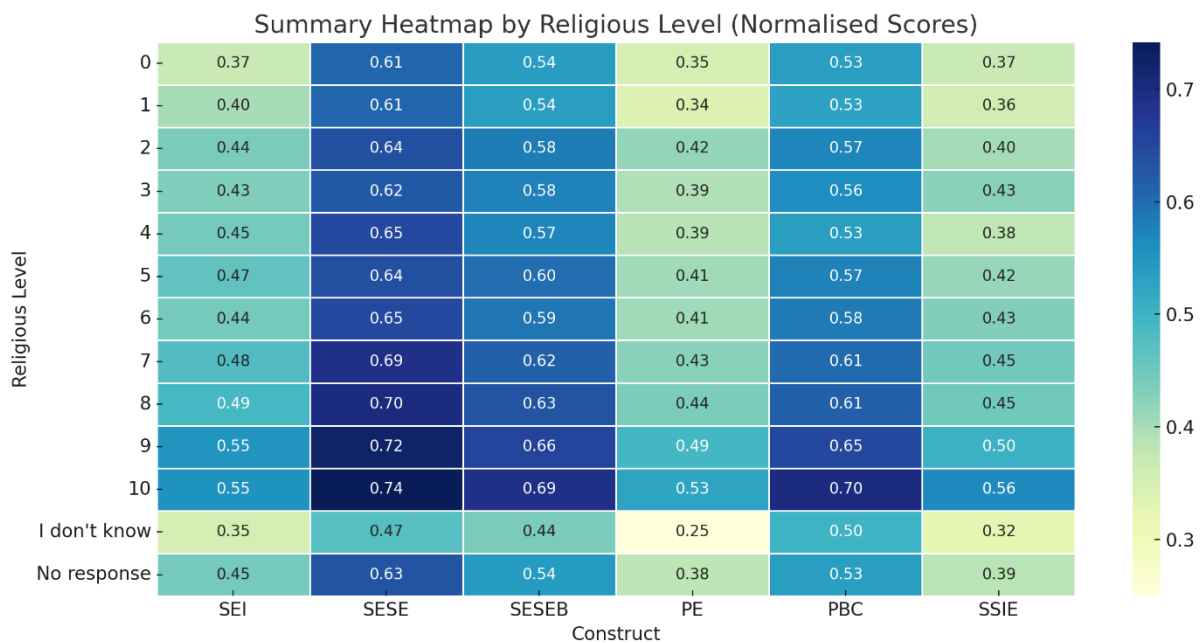


Figure 26. Summary Heatmap by Religiosity

Political Level

The heatmap displays scores across self-reported political engagement or positioning (0–10). A mild upward trend is visible, with participants reporting 10 showing the highest normalised scores.

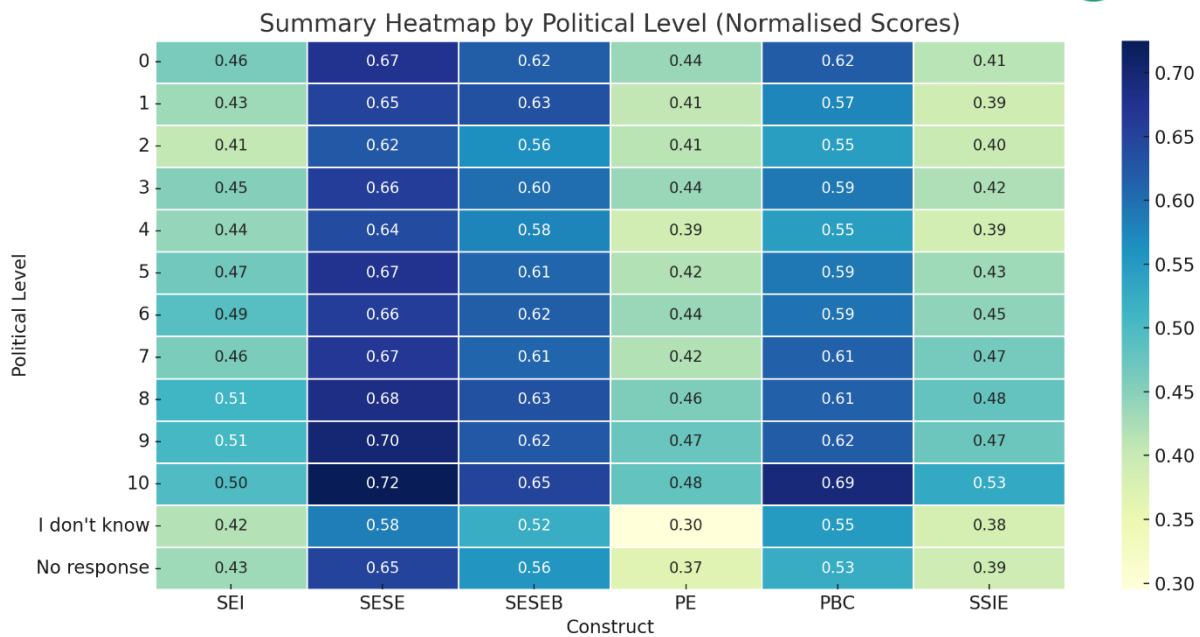


Figure 27. Summary Heatmap by Political Positioning

Country

This heatmap compares participants from Greece, Italy, Poland, and Romania. Romania stands out with consistently high scores across nearly all constructs, while Greece shows slightly lower levels, particularly in PBC and SSIE.

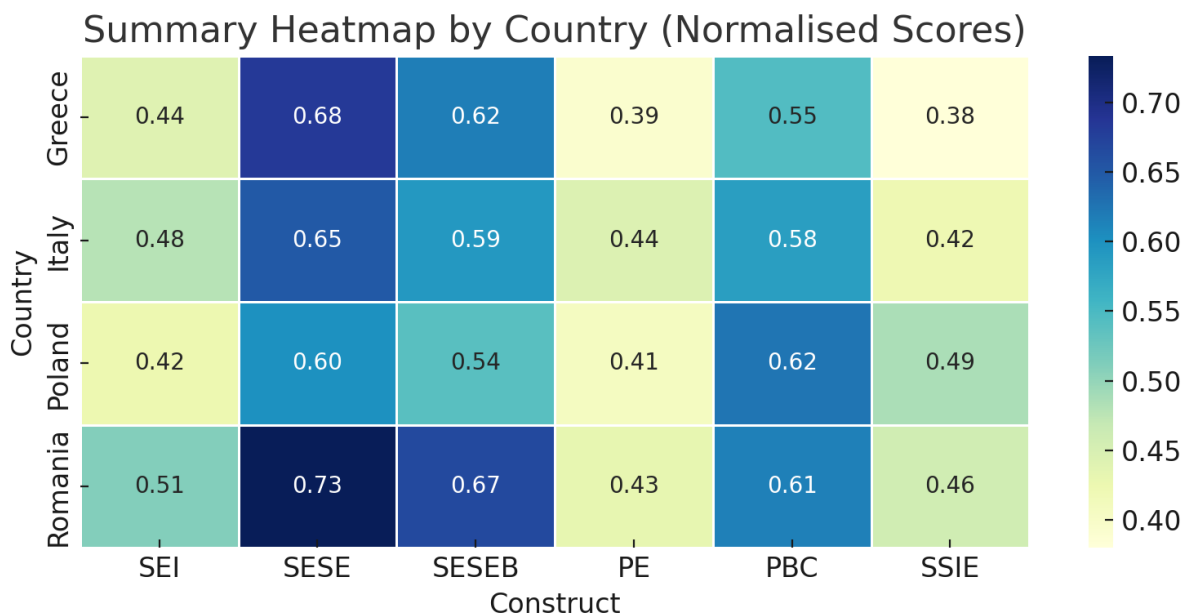


Figure 28. Summary Heatmap by Country

8.4 Annex IV – Mixed Level Regression

We also explore a mixed (multilevel) regression model to check the validity of our OLS regression results. A multilevel regression model is a statistical technique used to analyse data that has a

hierarchical or nested structure, such as individuals grouped within regions. Unlike standard regression models that include only fixed effects – variables assumed to have a uniform impact across all observations – mixed models incorporate both fixed effects and random effects. This allows the model to account for intra-group correlation.

Table 39. Mixed Level Regression

Variable	SEI	SEF	SEB	PE
	(1)	(2)	(3)	(4)
Performance-based culture	0.186***	0.301***	0.269***	0.183***
	(0.020)	(0.020)	(0.020)	(0.020)
Socially supportive institutions	0.146***	0.045**	0.130***	0.218***
	(0.020)	(0.020)	(0.020)	(0.020)
Religion	0.128***	0.091***	0.087***	0.090***
	(0.018)	(0.017)	(0.017)	(0.017)
Political	0.001	-0.001	-0.020	-0.024
	(0.017)	(0.017)	(0.017)	(0.017)
Age	-0.190***	-0.087***	-0.058***	-0.140***
	(0.017)	(0.016)	(0.016)	(0.016)
City Size	0.019	-0.008	-0.003	-0.003
	(0.017)	(0.017)	(0.017)	(0.017)
Ethnicity	-0.033**	0.018	0.022	-0.006
	(0.016)	(0.016)	(0.016)	(0.016)
Education	0.050***	0.040**	0.061***	0.090***
	(0.017)	(0.017)	(0.017)	(0.017)
Personal Income	0.029	0.081***	0.075***	0.059***
	(0.018)	(0.018)	(0.018)	(0.018)
Male=1	0.046***	-0.002	0.003	0.014
	(0.016)	(0.016)	(0.016)	(0.016)

Non-Binary=1	-0.007 (0.016)	-0.005 (0.016)	0.007 (0.016)	0.013 (0.016)
Poverty Rate	0.062** (0.028)	0.051* (0.028)	0.068** (0.029)	0.074*** (0.028)
GDP growth	0.062 (0.117)	0.136 (0.114)	0.118 (0.118)	0.207* (0.117)
Technology	0.006 (0.035)	0.002 (0.034)	0.000 (0.035)	0.010 (0.035)
Population Density	-0.015 (0.029)	-0.008 (0.028)	0.006 (0.029)	-0.037 (0.029)
Country Fixed Effects	Yes	Yes	Yes	Yes
Observations	3146	3146	3146	3146

Notes: Cluster standard errors at the town level are reported in parentheses. The p-values for the asterisks are 0.10 (*), 0.05 (**), and 0.01 (***).

The table 39 summarizes the results for all four dependent variables examined in the baseline analysis. The findings from the multilevel analysis closely align with those from the linear model. Notably, the estimated coefficient for the poverty rate remains consistent across models. Minor differences in statistical significance are attributable to a slight increase in standard errors; however, the magnitude and direction of the estimated effect remain unchanged.

The project



The **RIBES** project **aims** to enhance the uptake of bio-based innovations in ten (10) European regions (Bulgaria, Greece, Croatia, Italy, Poland, Romania, Serbia, Slovakia and Western Balkans) by developing new governance and business models that combine social entrepreneurship with rural development, thus advancing the transition to a circular economy.

Coordinator: **CENTRAL EUROPEAN INITIATIVE (CEI)**

PARTNER		SHORT NAME
	Central European Initiative	INCE
	Maastricht University	UM
	Centre for Research and Technology Hellas	CERTH
	BIOCOM	BIOCOM
	White Research	WR
	University of Hohenheim	UHOH
	CIRCE - Centro Tecnológico	CIRCE
	Q-PLAN International	QPL
	ARX.net	ARX.NET
	European Rural Development Network	ERDN
	Agricultural University Plovdiv	AUP
	MedINA	MedINA

	Energy Institute Hrvoje Požar	EIHP
	SPRING	SPRING
	Lucian Blaga University of Sibiu	BRDN
	Rzeszowska Agencja Rozwoju Regionalnego S.A.	RARR
	Balkan Rural Development Network	ULBS
	Faculty of Technical Sciences University of Novi Sad	FTN
	Bioeconomy Cluster	BEC
	FORZA Agency for Sustainable Development of the Carpathian Region	FORZA

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