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PERSPECTIVE

## The role of intermediary organizations in the mainstreaming of Responsible Research and Innovation in the Italian industrial sector

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### ABSTRACT

Innovation can be conceived of as ‘collective experimentation’, and industry can be viewed as a full partner in heterogeneous innovation networks. The significance of Responsible Research and Innovation (RRI) depends on the possibility of aligning the diverse actors involved in innovation processes, including firms. A specific challenge in Italy is that the overall majority of industrial companies are small and medium enterprises (SMEs). By reporting the opinions of the participants in an Italian stakeholder workshop, this article suggests that intermediation processes and intermediary agents have an important influence on the uptake of RRI in SMEs.

### KEYWORDS

Responsible Research and Innovation (RRI); Italy; innovation networks; intermediary organizations; industry; small and medium enterprises (SMEs)

### Introduction: intermediaries and Responsible Research and Innovation (RRI) in industry

Innovation can be conceived as ‘collective experimentation’, i.e. a co-evolutionary process in which many actors are involved in building new networks suitable for developing and stabilizing new technological artefacts as well as renewed social interaction models (Felt 2007; Geels 2002). Concepts such as the Triple (Leydesdorff and Etzkowitz 1998) or Quadruple Helix models (Carayannis and Campbell 2009) emphasize the diversity of such networks. Though the number and nature of the actors deemed significant for innovation processes typically differ, a common tenet of these models is the essential presence of industry in research and innovation processes, as industrial and business actors play an important role in funding and conducting research activities, as well as in diffusing innovations through the incorporation of scientific knowledge and new technologies in their products and services.

Intermediation has emerged as a key notion for exploring how innovation networks function, and, notably, for explaining how collaborations are built and knowledge is exchanged between research organizations and industrial actors. Individuals (e.g. consultants), organizations (e.g. technology transfer facilities), and specific units or organizational arrangements within broader organizations (e.g. industrial liaison offices in universities), start, foster, and facilitate these processes, establishing and strengthening the relations between actors and activities in innovation networks and systems through their

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intermediation activities (Hessels 2013). Intermediaries perform a number of functions, including information scanning and processing, knowledge processing and adaptation, gatekeeping and knowledge and technology brokering, testing and validation of technologies and standards, and commercialization (Howells 2006). These functions are performed not only in one-to-one interactions; intermediation instruments and actors increasingly operate at a network or system level (van Lente et al. 2003). This systemic significance makes intermediaries' activities less centred on passive reactions to their clients' requests and more oriented toward an active strategic and managerial role in innovation networks that encompasses functions such as innovation process design and network development and management (Katzy et al. 2013; van Lente et al. 2003).

The outsized role of industrial actors in such innovation networks makes them essential protagonists in Responsible Research and Innovation (RRI) implementation and diffusion. Moreover, since innovation emerges from interactions within these complex networks and relations, it is in such a framework that RRI must be located (Owen, Macnaghten, and Stilgoe 2012). While these observations may appear obvious, the RRI literature has only of late started exploring the meanings and practices of RRI in industry (Scholten and Blok 2015). This recent interest is demonstrated by a growing number of studies on the inclusion of RRI in companies' strategies and practices (Lubberink et al. 2017; Martinuzzi et al. 2018; van de Poel et al. 2017). However, even when firms' relations and networks are taken as the object of such analysis (Ceicyte and Petraite 2018), intermediaries and intermediation processes have been neglected, and their actual or potential roles in fostering the uptake of RRI in the industrial sector is under-theorized.

This article makes an initial case for the importance of intermediaries and intermediation processes in fostering the engagement of firms in RRI. This provocation is based on the results of a stakeholder workshop held in Padova, Italy, in February 2017 that signalled this significance.<sup>1</sup> The workshop was convened to discuss the challenges, opportunities, and solutions of/for RRI diffusion and implementation in Italy. In this context, the link between industry and RRI emerged as a recurrent topic. This article briefly presents the participants' views of the obstacles to diffusing RRI in the Italian industrial system, and it concisely illustrates their opinions on how these challenges can be successfully addressed. While the notion of 'intermediation' was never explicitly mentioned in the workshop, we suggest that the instruments and functions of innovation intermediaries were implicitly, yet clearly, referred to as possible solutions to these challenges.

In the following sections, we first present the key features of the Italian industrial system that were mentioned in the workshop and illustrate their perceived implications for the adoption of RRI in the business sector. Second, we describe the approaches to fostering firms' engagement with RRI and the roles of intermediation processes and intermediary agents and organizations in RRI that were discussed by the participants.

## **The structure of the Italian business sector and the challenges for RRI**

The workshop participants viewed one peculiar characteristic of the Italian industrial structure as a decisive factor in shaping the opportunities and constraints for RRI. In essence, the fragmentation of Italian industry into small and micro firms was blamed as the chief obstacle to companies' uptake of RRI.<sup>2</sup> Indeed, small and medium enterprises (SMEs) represent by far the majority of Italian businesses, contributing to more than

three-quarters of employment in the non-financial sector and more than two-thirds of value added. Among SMEs, micro-firms constitute the predominant group. These values are much higher than the EU28 average.<sup>3</sup> The workshop participants saw SMEs as struggling to cope with competition in the market and lacking the resources to engage with subjects such as RRI that are not directly related to their production and commercialization activities.

As a consequence of this lack of resources, SMEs were thought to lack the capacity to engage with RRI and to anticipate, reflect and act on the broader environmental and social implications of their activities. On the one hand, this is due to the peculiar features of these problems: they have a multi-dimensional nature, and multidisciplinary expertise is required to understand and tackle them (Technology Transfer Facility #2).<sup>4</sup> Gathering such a broad pool of competences is far beyond the possibility of individual SMEs. This limitation also affects SMEs' capacity to identify the knowledge and resources they need to address such implications, as well as their ability to communicate those needs to other actors in the innovation system who could address them (Technology Transfer Facility #1). On the other hand, participants perceived that small businesses most often see these broader social and environmental considerations as mere costs negatively affecting their performance in a strongly competitive market environment: 'You can't start corporate social responsibility initiatives if they are seen as a mere cost for individual firms, especially in SMEs', said one participant (Technology Transfer Facility #2).

This narrow focus emerged again when relations with other firms in the value chain were considered. The workshop participants reported that the majority of industrial SMEs manufacture intermediate products in the context of business to business relations. These products are further assembled or transformed before reaching consumers, but SMEs are considered to be generally indifferent to what happens 'downstream' in the value chain. In the words of one participant, this amounts to firms handing over the responsibility for the broader impacts of their products (Technology Transfer Facility #1).

## **Intermediation and RRI in the Italian industrial sector**

As a counterpoint to this diagnosis, intermediation was seen by the workshop participants as a response to these challenges, one able to provide SMEs with the support they need to incorporate RRI into their operations. While there was no direct reference to this concept, the instruments and functions of innovation intermediaries were implicitly, yet clearly, referred to as possible solutions to these challenges. The following explications illustrate this correspondence.

*Testing and validation of technologies and standards:* Intermediaries can test and validate existing RRI tools and standards in order to facilitate their application in individual firms. 'Firms need tools that they can implement by themselves', affirmed one participant (Technology Transfer Facility #3). The involvement of specialized certification agencies in the development of these types of instruments was viewed as an important element for successfully incorporating them in individual firms and for supporting companies in building the capacities they need to apply them (Public Innovation Centre #1).

*Knowledge processing and adaptation/Gatekeeping and knowledge and technology brokering:* Enabling SMEs to engage with RRI requires the processing, adapting, and transferring of the knowledge and technologies that can help them anticipate and address the

broader impacts of their activities. Strengthening technology transfer organizations, such as science parks and incubators, is seen as one method to reach this goal. In addition, universities and research organizations can be called on to create ad hoc multidisciplinary applied research groups or centres. The centres should include expertise in the humanities, the social and environmental sciences, and communication (Technology Transfer Facility #2). With the help of professional designers, these centres should promote user-oriented co-design processes for integrating social and environmental considerations in industrial products and processes (Public Research Organization #1).

*Information scanning and processing:* Firms' reception of the knowledge produced by research actors depends on the perceived relevance of such knowledge. A precondition for producing such relevant knowledge is 'decoding' what companies need: researchers have to develop sufficient knowledge of the market environment, production processes, and organizational culture of their target firms. As this knowledge can hardly be possessed by single individuals, multidisciplinary collaborations are required to successfully perform this task. The multidisciplinary centres described above are identified as sites where cooperation can and should take place (Technology Transfer Facility #2).

*Network development and management:* The diffusion of RRI in the industrial sector could be strongly supported by the creation of national collaboration platforms, either endorsed or organized by national policy makers. Unfortunately, one participant lamented, such platforms do not exist, despite their potential role in fostering mutual learning between firms and policymakers (Technology Transfer Facility #1). A second role which could be assigned to these national initiatives is to support SMEs' commitment, engagement, and collaborations over time. This support is crucial as the incorporation of RRI in firms' business models can plausibly bring benefits only in the medium to long term. However, such a time span is inconsistent with the organizational cultures and management routines of SMEs, which are likely to perceive investment in RRI as a mere cost (Public Innovation Centre #1). By offsetting these costs, public and systemic intermediaries can create a sensible path to bridge this temporal gap, help SMEs invest in RRI, and maintain over time viable responsible innovation networks (Academia #1).

## Concluding remarks

In this article, we discussed the challenges and possibilities for mainstreaming RRI in the Italian industrial sector. We did so by reporting the considerations, comments and proposals made by the participants in a stakeholder workshop held in Padova, Italy, in February 2017. The workshop participants raised the concern that SMEs, which represent the overwhelming majority of Italian industrial companies, lack the knowledge and financial resources to engage with RRI. We observed that the instruments and functions of innovation intermediaries were implicitly, yet clearly, referred to as possible solutions to these challenges.<sup>5</sup> Examples of these functions include information scanning and processing, validation of technologies and standards, knowledge processing and adaptation, gate-keeping and brokering, and network development and management.

In the introduction, we indicated that the notion of intermediation has a significant importance in the study of innovation. On the contrary, this concept is almost absent in the debate on *responsible* innovation (for a few exceptions, see Guston 2007; Randles et al. 2015) and, to the best of our knowledge, it is missing altogether in the literature

about RRI in industry. Even if this short article cannot provide a comprehensive theoretical framework about the ways in which intermediary organizations and processes can and do affect the uptake of RRI in the industrial sector, nor does it present a thorough empirical assessment of this influence, by reporting stakeholders' opinions it makes the case for acknowledging a role for intermediary organizations in RRI and for conducting further research on this topic.

## Notes

1. The workshop was organized in the context of the H2020 'Responsible Research and Innovation in Practice' project ([www.rri-practice.eu](http://www.rri-practice.eu)). The workshop was attended by twelve stakeholder representatives from academia, public and private research organizations, civil society organizations, funding agencies, technology transfer facilities, and public sector innovation centres. The workshop was convened to explore stakeholder views of responsibility in research and innovation, their opinions on the barriers to and drivers for responsibility in research institutions, and their observations about existing RRI practices and programmes in Italy. The following sections present selected passages from the workshop discussions that deal with the topic of this article. These examples are meant to support our conceptual argument in this paper, and they should not be considered as a systematic discussion of the workshop results or as a comprehensive analysis of the topics discussed in the debate.
2. We acknowledge that these short notes do not provide a sufficiently detailed description of the Italian industrial system and that other elements and characteristics can affect the diffusion of RRI in industry. We focus on this aspect as it reflects the workshop discussion we are reporting on.
3. Data are from the 'Annual Report on European SMEs 2016/2017' published by the European Commission (Muller et al. 2017). The European Commission determines whether an enterprise is an SME according to two main factors: staff headcount (up to 50 employees for small firms, up to 10 employees for micro-firms), and either turnover or balance sheet total (up to €10 million for small firms, up to €2 million for micro firms).
4. The information following the quote indicates the professional situation of a participant, while the number identifies a particular informant belonging to a professional category.
5. In passing, we note that intermediary organizations may have an even greater relevance in the Italian context, where local and regional characteristics play an important role for the development of innovation, as emphasized by several studies focused on industrial districts (Becattini, Bellandi, and De Propris 2009) and regional innovation systems (Cooke 1992; Asheim, Lawton Smith, and Oughton 2011).

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