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Leveraging interorganizational networks to foster university-industry interactions

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ABSTRACT

University-industry interactions are often criticized for being sporadic and unsystematic, which limits their overall potential for impactful innovation. This paper studies how universities can promote more structured and continuous interactions through formalized interorganizational networks with industry. Based on a six-year longitudinal study of a network created by a large university (i.e. the UniSMART Community at the University of Padova, Italy), we analyze micro processes that can be leveraged by universities to foster technology transfer initiatives over time. Our work reveals key insights into how such a network works, how external and internal actors engage with it, and how to foster technology transfer interactions in such a setting. We contribute to the technology transfer literature by identifying how universities can systematically lead these interactions, detailing their evolution over time, and incorporating the perspectives of both academic and industrial stakeholders.

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Interorganizational network; university-industry; technology transfer; academic engagement; case study

Introduction

Despite their well acknowledged importance, universities' interactions with industry are often criticized for being one-off and sporadic (Levy, Roux, and Wolff 2009; Orazbayeva and Plewa 2022). All over the world, one of the key challenges for universities and their Technology Transfer Office (TTO) managers is to find solutions to foster these interactions and make them more systematic and continuous. In fact, in some cases, these initiatives – which may involve different issues, such as collaboration in science and technology, training, consultancy, etc. – have represented isolated cases driven by individuals, neglecting more structured and formal approaches that are believed to facilitate the involvement of multiple stakeholders within strategic long-term partnerships, determining impactful innovation outcomes (Freitas, Geuna, and Rossi 2013).

In recent decades, a debate has emerged on alternative paths to foster university-industry interactions. Besides well-established initiatives associated with technology transfer outcomes such as licensing contracts negotiation or spin-off creation (Cesaroni and Piccaluga 2016; D'Este and Perkmann 2011), growing attention has been paid by both academics and policy makers towards alternative knowledge exchange and research valorization paths (European Commission 2021; Munari and Toschi 2021), going beyond traditional technology transfer outcomes and involving wider engagement approaches (Perkmann et al. 2021). This broader scope includes not only formal activities such as collaborative research, contract research, and innovation consulting but also the establishment of structured networks (Perkmann et al. 2021).

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While the former type of interaction has been extensively investigated in the technology transfer literature (Jonsson, Baraldi, and Larsson 2015a; McKelvey and Zaring 2018; Patricio and Santos 2020), the latter remains much less explored. As a matter of fact, more and more universities have started to structure their own formalized interorganizational networks with industrial stakeholders to reinforce routine interactions with the partners and increase the likelihood of collaborative initiatives (Huggins, Prokop, and Thompson 2020; Lavie and Drori 2012). However, while the technology transfer literature extensively investigates universities' networking strategies with industry and how researchers personally leverage their social capital at the individual level (Beaudry and Kananian 2013; Welsh et al. 2008), studies that shift the focus to the operative perspective of this process are still lacking. Specifically, we think it is necessary to better understand how universities can build and manage such interorganizational networks and which are the micro processes that can stimulate constant interactions with industry over time (Alexander, Miller, and Fielding 2015; Jonsson et al. 2015b). In other words, further investigation is required into the more formalized and structured approaches that universities implement to foster wider industry engagement, supporting continuous interactions with industry (Freitas, Geuna, and Rossi 2013).

To address this issue, we pose the following research question: *How do universities leverage formalized interorganizational networks to foster technology transfer initiatives over time?* Answering this question becomes relevant, as structured interorganizational networks have the potential to establish continuous, multi-party collaborations that transcend ad hoc interactions. To explore this topic and acknowledge its evolving nature, we performed a longitudinal case study (Yin 2013) based on an inductive approach. We considered the case of the University of Padova, which set up an interorganizational network with industry in 2016. This is one of the world's oldest and leading research universities, which acts as a multidisciplinary institution in Northern Italy, with a strong focus on technology transfer, 70,000 students, and over 200 active patents. Throughout its life, the university's interorganizational network has involved more than 190 organizations and almost 45% of them engaged in multiple technology transfer initiatives with the university. We performed an analysis on 38 interviews carried out with the network's promoters, organizers, and participants involved in engagement initiatives between 2018 and 2023, triangulating with multiple sources.

Our findings provide insights into how such an interorganizational network with industry works, how external actors and internal actors engage with it, how to foster technology transfer initiatives in such a context, as well as the participants' pattern. This paper contributes to technology transfer literature in three ways. First, building upon interorganizational networks literature (Ghoshal and Bartlett 1990; Park 1996) and its application in technology transfer studies (Beaudry and Kananian 2013; Boehm and Hogan 2014), we identify the micro processes that underpin university-industry interactions in such a context, revealing how universities can lead networks of this sort to foster systematic interactions with industry.

Second, although prior work examines similar interactions, scholars often focused on specific and rather limited timeframes (e.g. Alexander, Miller, and Fielding 2015; Angrisani, Dell'Anno, and Hockaday 2022). Since leveraging interorganizational networks to build those kinds of university-industry ties requires time (Boehm and Hogan 2014), such treatment obscures potential insights that may emerge by looking at the evolution of these science-industry interactions over time (Dąbrowska, Lopez-Vega, and Ritala 2019; Pinarello et al. 2022). Therefore, our work considers six years of formal and structured interactions between these different players, offering a more comprehensive perspective on the micro processes that underpin these dynamics.

Finally, while these kinds of interactions are often considered by exclusively putting researchers at the center (e.g. Huggins, Prokop, and Thompson 2020; Sense 2016; Zhao, Broström, and Cai 2020), we argue that there is room for further comprehension of this phenomenon including the perspectives of external actors that engage with the university rather than solely researchers that engage with industry. Therefore, our study includes a multi-level perspective, involving multiple informants who participated in the creation and management of interorganizational networks between the

university and industry. Drawing on Fichter (2009) and Alberti and Pizzurno (2015), we identify different typologies of participants according to the frequency of their involvement in the technology transfer initiatives and their experience within such a university-led network with industry.

From a practical perspective, we believe that a further understanding of those mechanisms will provide operative insights for universities willing to establish recurrent interactions with industrial players (Crupi et al. 2021; Striukova and Rayna 2015), as well as for firms' managers willing to understand whether a network of this sort may be a viable path to solve problems or to scout solutions through external knowledge involvement.

Literature review

Interorganizational networks are commonly recognized as complex webs of ties spanning and interconnecting different organizations within and across different sectors (Powell, Koput, and Smith-Doerr 1996). Such networks can involve both deep and wide ties and are characterized by contractual or less formal modes of interaction (Elmquist, Fredberg, and Ollila 2009). They are commonly recognized as *loci* of learning, where organizations can rely on large scale collaborations to access knowledge and technology that are subject to flows between actors (Owen-Smith and Powell 2004; Simard and West 2006).

This is why interorganizational networks can create the conditions to support and spur the development of innovations among a variety of heterogeneous actors, such as suppliers, customers, science partners, universities, research organizations, governmental institutions, NGOs, or financial institutions (Dagnino et al. 2015). In overcoming the managerial, organizational, individual, and cultural barriers that may inhibit the collaborative innovation process, the structure of network relationships between different innovative actors in terms of proximity is an enabler of innovation dynamics across multiple partners (Ooms and Piepenbrink 2021), especially when it comes to response to specific challenges or to anticipate market opportunities, saving time and resources in comparison to developing that knowledge internally or acquiring it through vertical integration (Simard and West 2006).

Commonly, organizations operating within the boundaries of interorganizational networks may access and leverage knowledge-based assets from other networked organizations to enhance their innovation performance (Dagnino et al. 2015). This is the case of a variety of forms of cooperation (e.g. joint ventures, strategic alliances, collaborations, coalitions, and consortia) among two or more organizations belonging to different organizational settings (Provan, Fish, and Sydow 2007). However, among the possible network interactions of this sort, in recent times, interorganizational networks between universities and industry gained traction among researchers and practitioners as a peculiar approach to investigate and implement (Huggins, Prokop, and Thompson 2020). In fact, those interorganizational networks are recognized as a possible solution to facilitate multi-stakeholders' interactions for co-generating new knowledge and solving problems collaboratively (Lee et al. 2019). The strength of this kind of structure directly reflects the strength of its connections across different actors (Capone and Lazzeretti 2018). Therefore, the innovation spillovers that result from these linkages are directly related to the institutional commitments and practices of the network members (Owen-Smith and Powell 2004) as much as to the specific project expertise collectively employed to innovate (Lee et al. 2019).

When such networks deal with the challenge of fostering collaborative innovation initiatives among different partners, several actors must work together on new knowledge creation, learn from each other, and build upon mutual contributions (Audretsch and Belitski 2021; Brown and Hagel 2006). Thus, drawing on Fichter (2009) and Alberti and Pizzurno (2015), three different actors are required to make those networks work: (i) actors who start the network creation process by deciding who participates and defining participation protocols; they may be institutional players but they are not limited to these, i.e. *promoters*; (ii) operative actors working in keeping the network alive, choosing the appropriate way of coordination, such as administrative staff or team

deputed to manage the network, i.e. *organizers*; (iii) organizations involved in the network and participating in the overall interaction process, i.e. the *participants*.

Among the possible actors that can be involved in interorganizational networks, universities indeed represent a valid outlet to promote and settle these initiatives and provide research-based inputs for industrial innovation. One of the main issues in interorganizational networks involving universities and industry is that even if academic partners often seem to be prone to take part in external engagement initiatives, they tend to differ in terms of proactivity when it is time to meet potential partners and set up interactions of this sort. For this reason, Striukova and Rayna (2015) pointed out the need for a multiplicity of well-integrated partners under formal engagement mechanisms for an effective transfer of assets between the parties to succeed.

However, even if the exchange of knowledge and technology is at the very heart of the life of those networks, technology transfer literature mostly overlooked this phenomenon when it comes to considering specific networks led by universities to foster mutual engagement with industry. In fact, we know a lot about how to settle and manage more contractual based technology transfer interactions (e.g. Alexander, Miller, and Fielding 2015; Jonsson et al. 2015b), which are more diffused (i.e. licensing contracts, spin-off creation) (Cesaroni and Piccaluga 2016; D'Este and Perkmann 2011) or emerged in practice in the last decades (e.g. collaborative research, contract research, and innovation consulting) (Perkmann et al. 2021), but still little is known when we consider interorganizational networks from this angle.

More and more universities started to structure their own formalized interorganizational networks with industrial partners to reinforce routine interactions and increase the chances to actively engage with them (Huggins, Prokop, and Thompson 2020; Lavie and Drori 2012; Sense 2016). While some studies recognized the potential of interorganizational networks to support universities in addressing the key challenge of establishing continuous and multi-party collaborations that transcend ad hoc interactions (Beaudry and Kananian 2013; Boehm and Hogan 2014), they all investigate those networks from the outside, overlooking the micro processes that underpin the organization and management of these networks throughout the stages of their life. Therefore, we argue that additional research is required to examine the formalized and structured approaches employed by universities that settle, lead, and leverage their own interorganizational network to promote broader industry engagement and to support sustained, rather than sporadic interactions with industry (Levy, Roux, and Wolff 2009; Orazbayeva and Plewa 2022).

Therefore, given the need for universities to systematize and establish continuous interactions with industry, and given the general lack of studies on the process that underpins the organization and management of university-industry interorganizational networks over time, a significant gap remains in understanding how universities leverage such networks to foster long-term technology transfer initiatives and how this process evolves.

Research methods

The research setting

Our case concerns the interorganizational network with the industry of the University of Padova, a large university (hereafter referred to as the University) located in the North of Italy. This university is one of the oldest in the world, it is an international leader in research, and it is characterized by a strong focus on technology transfer since its foundation. An example is the case of Galileo Galilei, among the most prominent researchers of the seventeenth century that in this university invented and implemented a new instrument, later called a 'telescope', that found application not only in the academic world but also in the broad society (Grimaldi, Kenney, and Piccaluga 2021).

Today, the University is a multidisciplinary institution with eight Schools and 32 Departments, ranging from Engineering to the Humanities, from Medicine to Law, from Agriculture to Psychology, and from Pure Sciences to Economics. The University employs more than 4,500 people (i.e.

professors, researchers, and administrative staff). It holds over 200 active patents, 52 spin-offs, and nearly 600 research contracts each year. The University currently enrolls more than 70,000 students and is stably ranked among the top universities in the world in several international rankings (QS, THE, ARWU). Furthermore, it has been characterized by a recent increasing intensity in technology transfer activity. For example, income from commissioned research and technology transfer amounted to almost 16 million euros in 2023.

The context of Italy represents an interesting outlook to consider because of its experience and reputation in the international research system as well as the strong performance of many Italian firms in various sectors (Grimaldi, Kenney, and Piccaluga 2021). From an R&D and technology transfer perspective, such a context has always been a latecomer to other countries and, only in the past 20 years, it has experienced rapid growth (Cesaroni and Piccaluga 2016). Therefore, such a setting may be peculiarly informative for all those universities operating in a national context still in the early development phase.

Specifically, the context in which this university is located consists of a vivid entrepreneurial ecosystem with almost 400,000 firms in the surrounding area. Following Munari and Toschi (2015) who rely on the Eurostat database, the Regional Innovation Intensity for this region (NUTS2 level) is among the highest in Italy and Europe. This means that the industrial context in which the University operates reflects a good positioning in terms of R&D expenditures, R&D researchers, human resources in the science and technology field, and employment in technology and knowledge-intensive sectors as much as in the number of patent applications at the European Patent Office.

The University represents an interesting context to investigate since it established an in-house limited company in 2016 to better deal and engage with its vast set of external actors that lately became a Foundation (namely, UniSMART – the University Foundation). When it comes to considering universities' intermediaries with the external environment, this is one of the possible approaches recognized in literature and practice (Muscio 2010; Villani, Rasmussen, and Grimaldi 2017). This organization was specifically established to foster and support technology transfer dynamics between the university and the external environment and to develop a formal interorganizational network of the university's industrial stakeholders (namely, UniSMART Community).

Every firm pays a yearly fee to participate in this network. On average, the fee is 3.000 Euros, and the amount varies according to the firms' size. This is a membership fee that allows the firm to become part of the network. Between 2016 and 2022, 190 firms were involved in the UniSMART Community as partners. We schematized their sectors of activity in Table 1. Furthermore, almost 45% of the firms involved engaged in interactions with the University more than once, indicating their commitment towards collaborative initiatives.

This interorganizational network is promoted on UniSMART's website as follows:

Table 1. Network participants by sector.

Sector	Network share
Human resources	1.4%
Paper	1.4%
Building materials	4.2%
Chemicals and related	2.8%
Communication & IT	4.2%
Food	8.5%
Mechanics	11.3%
Energy	12.7%
Materials	4.2%
Economy and Finance	7.0%
Consulting	15.5%
Electronic	4.2%
Other	22.6%

> UniSMART Community is the network of the University of Padova that supports private and public entities to generate value through constant interactions. Becoming a participant not only allows the organization to sit at the table with one of the largest and most prestigious Italian universities but opens a series of benefits to concretely support the organizations that want to embark on paths of engagement with tangible results.

To properly manage the UniSMART Community and to stimulate the emergence of technology transfer initiatives, nowadays the University Foundation accounts for 30 employees, all of them dedicated to managing the relationships with these stakeholders. The presence of these supporting actors reflects the level of formalization of this university's interorganizational network with industry.

Research design and case selection

To address our 'how' research question, we conducted a longitudinal case study (Yin 2013), using an inductive approach which is recognized to be appropriate for these kinds of studies (Villani and Lechner 2021). The objective is to increase the understanding of how universities leverage formalized interorganizational networks to foster technology transfer initiatives and how this process can evolve over time. We consider the case of the UniSMART Community previously described and its evolution between 2018 and 2024. Drawing on Yin (2013), we decided to adopt a single-case design, rather than a multiple-case design, for two reasons. First, a longitudinal analysis requires this design when exploring the evolving nature of a phenomenon of extensive duration. Thus, single case design allows us to explore in depth and therefore capture, describe, and discuss changes over time in detail. Second, networks of this sort are characterized by complex interaction mechanisms (West and Bogers 2014), and for this reason, a single case research design better enabled us to closely investigate the different stages of such a challenging phenomenon that deserves more attention from the extant literature.

The selection of the case relies on the basic principles of theoretical sampling (Yin 2013). When it comes to case selection, the case under investigation was chosen for two main reasons. First, we selected this case of university-led interorganizational network because it complies with the theoretical background that we previously defined according to these three criteria: (i) the formality of the network, (ii) a clear distinction among the three actors involved (i.e. promoters, organizers, and participants), (iii) the actors' commitment towards technology transfer initiatives. Second, there is a matter of data access. In compliance with the principles of 'engaged scholarship' (Bansal, Smith, and Vaara 2018; Van de Ven 2007; Van de Ven and Johnson 2006), one of the authors has collaborated for several years in research and practice with key informants involved in the activities of this interorganizational network. They were informed that the gathered data would serve the purpose of research, which was crucial in facilitating data access. The prior existence of such an amount of data represented a unique opportunity to better understand how a university-industry network of this sort can work and facilitate the emergence of technology transfer initiatives over time. Thus, the case selected was perfectly in line with the idea of investigating the evolution of such an interorganizational network with industry from its very beginning. According to standard practices with studies of this sort, to avoid any possible conflict of interest in data collection, analysis, and interpretation, the other author was not previously involved in any way with key informants, reducing retrospective and personal interpretation bias (Van de Ven 2007).

Data collection and analysis

In our case study, the level of analysis is represented by the organizations involved in the interorganizational network with different roles (i.e. the UniSMART Community) and the level of analysis is represented by the professionals operating in those organizations. In fact, to properly address the research question and collect data, we adopted the individual unit of analysis, interviewing representatives for each of the three categories of actors, namely promoters, organizers, and participants.

To select our respondents, we adopted two sampling strategies: i.e. purposeful and snowball. Building upon the purposeful sampling guidelines (Yin 2013), we started with selected informants involved in the network creation process (i.e. promoters) and in keeping the network alive (i.e. organizers) because they appeared to be the most knowledgeable about the topic (Villani, Rasmussen, and Grimaldi 2017). Then, relying on snowball sampling guidelines (Yin 2013), we asked these informants to suggest other people involved in this university-led network who could provide relevant information (i.e. the participants). According to standard practice (Eisenhardt and Graebner 2007), we asked them to introduce us not only to external actors related to the successful initiatives and actions but also to the unsuccessful ones to observe contrasting patterns more easily among the respondents and to strengthen the representativeness of the sample.

More specifically, in our case study, we included primary sources (i.e. 38 interviews) related to different respondents (Table 2) and a set of secondary sources (Table 3) that we iteratively triangulated. When we look at the primary sources, on the network management side, we collected twelve interviews with promoters and eleven with organizers, while on the network participation side, we collected fifteen interviews with participants. We deliberately opted for a disproportion between participants and other actors to facilitate the emergence of insights on technology transfer initiatives resulting from the interorganizational network. Throughout their participation in the network, all the firms have been involved at least once in contract research with universities in their respective fields.

Table 2. Primary sources – Respondents' information.

Nr	ID	Category	Role	Length	Year	Industry (size)
01	PR1	*Promoters*	First UniSMART General Director	1hr 30′	2018	
04	PR2	*Promoters*	Institutional Founder	1hr	2018	
02	PR3	*Promoters*	Technology Transfer Manager	50′	2018	
03	PR4	*Promoters*	Technology Transfer Manager	1hr	2018	
06	PR5	*Promoters*	Chief Technology Officer	1hr	2020	
05	PR6	*Promoters*	Institutional Founder	1hr 30′	2020	
07	PR7	*Promoters*	Second UniSMART General Director	45′	2020	
11	PR8	*Promoters*	Community Manager	40′	2023	
12	PR9	*Promoters*	Institutional Founder	1hr	2023	
08	PR10	*Promoters*	Second UniSMART General Director	2 hr	2023	
09	PR11	*Promoters*	Second UniSMART General Director	1hr 30′	2023	
10	PR12	*Promoters*	Technology Transfer Manager	1hr	2023	
15	OO1	*Organizers*	IP Manager A	1hr	2018	
13	OO2	*Organizers*	Project Manager A	1hr 20′	2018	
14	OO3	*Organizers*	Project Manager B	45′	2018	
19	OO4	*Organizers*	IP Manager A	1hr	2020	
16	OO5	*Organizers*	Project Manager A	1hr 30′	2020	
17	OO6	*Organizers*	Project Manager B	1hr	2020	
18	OO7	*Organizers*	Project Manager C	40′	2020	
20	OO8	*Organizers*	IP Manager A	1hr 10′	2023	
23	OO9	*Organizers*	IP Manager B	55′	2023	
21	OO10	*Organizers*	Project Manager B	1hr	2023	
22	OO11	*Organizers*	Project Manager C	1hr	2023	
25	PP1	*Participants*	CSR Officer	50′	2018	Electronic (Small)
24	PP2	*Participants*	Managing Director	1hr	2018	Communication & IT (Medium)
26	PP3	*Participants*	R&D Manager A	40′	2018	Building materials (Large)
27	PP4	*Participants*	R&D Manager B	1hr	2018	Energy (Large)
28	PP5	*Participants*	R&D Manager C	45′	2018	Energy (Large)
31	PP6	*Participants*	CEO	40′	2020	Energy (Large)
30	PP7	*Participants*	Head of Operations	40′	2020	Materials (Large)
32	PP8	*Participants*	Open Innovation Manager	1hr	2020	Mechanics (Medium)
33	PP9	*Participants*	Project Manager	45′	2020	Cybersecurity (Medium)
29	PP10	*Participants*	R&D Manager B	1hr	2020	Energy (Large)
38	PP11	*Participants*	General Director	1hr	2023	Food (Medium)
34	PP12	*Participants*	Innovation Manager	45′	2023	Energy (Large)
35	PP13	*Participants*	R&D Manager D	50′	2023	Consulting (Small)
37	PP14	*Participants*	R&D Manager E	1hr	2023	Mechanics (Small)
36	PP15	*Participants*	Vice president	40′	2023	Consulting (Medium)

Table 3. Secondary sources.

Data source	Type of data	Description	Use in the analysis
Presentations	Internally disclosed	Seven official PPT presentations used to describe the University Foundations, its network, and the initiatives implemented between 2018 and 2023.	Triangulating information that emerged from interviews with respondents. Expanding our understanding of the network life from the promoters' and organizers' perspective.
Strategic Plans	Internally disclosed	Two triennial plans (i.e. 2019–2020 and 2022-2024) and six annual plans (i.e. 2018, 2019, 2020, 2021, 2022, 2023) indicating the key activities and the KPI related to the network creation and establishment.	Triangulating information that emerged from interviews with respondents. Gaining insights into how the network works and how its performance is measured.
Notes from internal meeting	Internally disclosed	Notes taken by one of the authors throughout multiple meetings with the internal management of the University Foundation between 2020 and 2023.	Expanding our understanding of network life from an internal management perspective.
Notes from the annual meeting of the network	Internally disclosed	Notes taken by one of the authors in the yearly meeting of the network participants between 2019 and 2023.	Expanding our understanding of the network life from a participants' perspective.
Charter	Publicly available	Charter of the University Foundation with detailed regulation of the network.	Understanding of the regulations that underpin the network's creation and management.
Participants' rules	Publicly available	Two documents with the rules for the network's participants.	Understanding of the regulations that underpin network's creation and management.
Videos	Publicly available	47 videos retrieved on the University Foundation social such as Facebook, YouTube, and LinkedIn related to the network, its participants, and its activities.	Triangulating information that emerged from interviews with respondents. Expanding our understanding of the network life from a participants' perspective.

Furthermore, we considered a combination of different perspectives on the network's evolution over time to better ensure the reliability and validity of the research (Villani and Lechner 2021).

To look at the evolution of the interorganizational network, interviews have been collected through multiple stages. The data collection process lasted around six years (i.e. 2018–2023). From October to December 2018, the first round of semi-structured interviews was conducted with several key informants in presence. These first five interviews were used within the scope of the development of dissemination materials on the UniSMART Community. In November 2020, the second round of semi-structured interviews has been conducted. Finally, we carried out a third round of interviews in November 2023. The second and third rounds of interviews have taken place through online calls carried out via the Zoom platform, while the first one took place in presence.

Please note the respondents are ordered in the chronological order in which interviews took place.

Table 2 summarizes the primary sources in terms of respondents, highlighting the different actors' categories, and their roles in their organizations. When considering a participant, we included the industry and the size of the firm. We also included information on the length of the interviews and the year in which we collected them. The University Foundation's employees, being promoters or organizers, have industrial and academic backgrounds in different fields related to innovation. Their majors are mostly related to industrial engineering, management, physics, and biotechnologies.

We recorded and transcribed the interviews in almost 140 pages of transcripts, integrated with notes. Interviews lasted between 40 min and two hours. We elaborated a semi-structured interview protocol for each type of respondent (Table A1 in Appendix). In the case of promoters and

organizers, the questions were mainly related to describing the life of the network, the way it is organized, how it evolved, and how firms engage with the university in such a setting. When it came to considering the participants, the questions in our protocol were mainly related to describing the organizations, and their innovation activities, as well as the drivers and barriers of engaging in a network as such. After explaining the concept of interorganizational networks to the respondents, we asked each of them to discuss practical cases of technology transfer and engagement in which they were involved.

Consistently with the longitudinal focus of our work, we analyzed our body of data collected through an open coding approach (Strauss and Corbin 1998) to inductively code the transcripts of our interviews. The aim was to identify relationships between data, emerging themes, and the existing literature. Therefore, we read, coded, and iteratively interpreted our data (Saldaña 2021), recognizing representative quotes, and sorting them into first-order concepts which were then combined into second-order themes. Finally, we grouped these results into aggregate dimensions. Throughout the coding of the transcripts, to increase the trustworthiness of our study, we employed a data collection strategy to minimize any retrospective interpretation bias. We constantly updated our work through triangulation with secondary sources (Yin 2013), thus reinforcing the internal reliability of our findings. Secondary sources have been internally disclosed, collected via direct in-field observations, or online retrieved through desk research. They include data such as presentations, documents, notes from meetings, and videos. We described them and their use in the analysis in Table 3.

This data analysis was performed in several stages by both authors. According to standard practice, each author went through this process independently between April and May 2024 by manually organizing data into Excel spreadsheets. Once our analysis indicated potential new connections, we progressively refined the codes to precisely characterize them until the process no longer yielded additional discoveries or associations among the existing ones, thus achieving data saturation. Following these individual steps, the authors came together in collaborative discussions to compare and merge their respective codes into a unified set of second order themes and aggregated dimensions.

By looking at the longitudinal nature of our data and considering the different behaviors and perspectives of the actors involved in this process, the coding process led to the identification of first-order concepts, nine second-order themes, and three aggregate dimensions. The coding procedure is shown in Table 4.

Findings

How does a university-industry interorganizational network work?

The case we considered leads to interesting insights into how an interorganizational network between university and industry may work, understanding how it can be leveraged to foster technology transfer initiatives over time. The first aspect that deserves attention is the fact that the network we considered (i.e. the UniSMART Community) is a formalized one (Elmquist, Fredberg, and Ollila 2009). This means that the network evolved over time under a strategic direction indicated by the promoters and, specifically, by the University. The aspect that the network was an instrument in the hands of university widely emerged in interviews with promoters and organizers. One of the organizers [OO1, IP Manager A] described the network as an 'emanation' of the University. UniSMART and its Community are formally controlled by a Board of Directors which every year is formally appointed by the University's Rector and that directly reflects the strategic orientation of that period of administration. The board also includes representatives from industry identified by the University governance.

In fact, at the very beginning, this interorganizational network has been specifically developed to valorize the assets (i.e. knowledge and technologies) of the University within a collaborative domain

Table 4. Coding procedure.

First order concepts (example)	Second order themes	Aggregated dimensions
I am quite sure that in a local context like ours, many firms enter the UniSMART Community for a matter of reputation. You know, the University is an important institution here, and being part of its network communicates a lot to firms' stakeholders. [OO3]	Reputation of collaborating with university	Drivers towards external actors' engagement inside the network
I believe there is a competitiveness issue. […] Firms, particularly SMEs but not only, cannot give up on researching and reaching, before their competitors, the most advanced technological cutting edge. We approached the UniSMART Community because collaborative innovation with the university is the only way to achieve this. [PR6]	Fast track to innovation to enhance competitivity	
For a firm like ours that cannot invest that much in research. We are too small to do innovation, so we aggregate with university labs to produce quality innovation and put cutting-edge products and processes into the market. [PP1]	Lack of internal infrastructures, financial resources, and capabilities	
We have to enable the firms to look at the university as a reference point for the local development and, at the same time, to help the university in keeping the territory as the ultimate goal of their research activities. [OO1]	Alignment of interest between actors	Drivers towards internal actors' engagement within the network
Our team takes a proactive role; we not only act as a connector between different parties, but also as translators between different languages. [PR5] One of the key challenges of our network is that the interaction between scientific and business communities is often hindered by connection problems and language barriers arising from distinct terminologies and perspectives. Explaining scientific concepts to business professionals might prove challenging, and research and development (R&D) or innovation managers may not readily embrace collaborations, perceiving researchers as outsiders suggesting solutions they haven't explored internally. [OO5]	Alignment of languages between actors	
We facilitate the process of interaction throughout the University Community networking events, designed for both organizational top management and operational staff. These events feature a comprehensive program including high-level dinners, workshops, and seminars involving prominent scientific figures from the University network. [PR3]	Meeting platform between different stakeholders	
We still systematically access the University knowledge thanks to the brokering activity of the UniSMART Community team. The UniSMART's Project Managers collect our needs and in-depth scout inside the University the people and assets that may be matched with us to better solve our corporate challenges. [PP10]	Scouting and matching from open needs	Mechanisms to foster technology transfer initiatives within the network
The UniSMART Community holds an exclusive agreement to commercialize these IP assets, utilizing a scalable model in licensing or transferring patents and other intangible assets owned by the University according to the different characteristics of the firms involved in the network. [OO4]	Problem-oriented technology valorization	
By fostering synergies and leveraging the established activities of the University's Technology Transfer Office (TTO), the Community creates a multiplier effect. Whenever there is a gap in enabling science and technology, the University steps in, utilizing its researchers, laboratories, and global network to address the specific needs. [OO1]	Multiplier effect through different partners' involvement	

and to generate an impact on the local innovation ecosystem. Our respondents clarified that it was not just a matter of pursuing assets' commercialization but also other objectives.

> The dominant paradigm for universities and industry in our network is to foster collaborative innovation. Our challenge is to bring together stakeholders to generate as many opportunities as possible, for the territory, for firms, and for institutions, impacting not only business, but also social, economic, and civic growth for our territory of reference. [PR10, Second UniSMART General Director]

The idea was to create a single entry-point to the interorganizational network 'where firms can ring the bell and the UniSMART Community's professionals can find the so-called innovation champions, i.e. professors with high experience in working with industry' [PR2, Institutional Founder]. Among the possible paths identified to pursue this goal, four possible technology transfer initiatives emerged. First, there is contract research, where network organizers 'stand as project managers for contracts commissioned by firms to professors and research groups of the University' [OO3, Project Manager B]. Second, we observed Intellectual Property valorization where 'from the moment in which the patent is registered, we [the organizers] exclusively manage the licensing process' [OO4, IP Manager A]. Third, there is the activity that deals with the university's engagement in collaborative research projects. Fourth, there is innovation consulting in which organizers 'support firms through technological scouting, market analysis, or in the individuation of the best innovation strategy towards a particular end' [OO6, Project Manager B].

The process is facilitated through a 'technology scouting and matching action with the best ideas which exist in the 'scientific population' made up of scientists at the University'. After that, the organizers 'involve the identified professors or researchers so that they initially invest some of their time in 'getting their hands dirty' and applying their skills, with the prospect that this could lead them to establish a research contract or another technology valorization outcome with their private-industrial counterpart from our network' [PR5, Chief Technology Officer]. To foster this process, the team of organizers is structured as follows.

> We are based on a multidisciplinary mix of people and skills that try to understand, for each challenge we receive from firms, what they are talking about and who inside the University could help us. In fact, we play the role of 'innovation manager' for so many small firms that they would not be able to fulfill it on their own: this is what justifies the interest of these firms in joining our community. [PR1, First UniSMART General Director]

How do external actors engage in university-industry interorganizational networks?

To better address our research question, we start by looking at the knowledge flows that are indeed fundamental in interorganizational networks as such and that directly reflect the reasons and the ways that underpin external actors' engagement in university-industry interorganizational networks.

Three different knowledge flows emerge from our case study. The first is an inbound flow. In this case, firms move from the outside of an external crowd toward the inside of the network. As emerged from our analysis, the three main drivers of this outside-in engagement are: (i) firms' *reputation of collaborating with the university*, since the University is an important institution in the local innovation ecosystem, 'being part of its network communicates a lot to firms' stakeholders' [OO3, Project Manager B]; (ii) *fast track to innovation to enhance competitivity*, since firms 'learn to activate collaborative research contracts with the University to be quick to look for new innovative solutions and get results that can be introduced to the market as products' [PP5, Head of Operations]; (iii) *lack of internal infrastructures, financial resources, and capabilities* that led firms to 'partner with university labs and access their facilities to access quality innovation' [PP1, CSR Officer].

As we will further investigate when presenting internal actors' engagement in the network, another relevant knowledge flow is the internal one. These interorganizational networks are well known to be dynamic environments characterized by a series of evolving practices (Shaikh and

Levina 2019). In the analyzed network, the whole process is managed by a Project Manager which is part of the UniSMART Community team dedicated to assisting the companies as much as their interaction with other partners and the universities. These organizers accompanied 'a process of integration between the know-how of our research and development department and the expertise of the university' [PP6, CEO]. As previously discussed, this is a step-by-step approach where companies started from 'open issues relevant to the company'. Thanks to the supervision of multiple actors and to the co-generation of knowledge with the research group, the company 'succeeded in integrating a new technology in the value stream to better access the market' [PP11, General Director]. Finally, a collaborative environment of this sort may represent a chance for companies to be positively contaminated by external actors with new ideas and perspectives.

The final knowledge flow is an outbound one. We had the chance to investigate with some of our respondents the reason why they had left the network. From our case study, three main reasons emerged: the lack of resources and commitments that have been reduced in some cases, 'in particular aftermath of the pandemic' [PP4, R&D Manager B]; the misalignment with the strategic goals of the firms that see that kind of collaborative initiatives with universities 'no longer in line with the strategic guidance of the new leadership' [PP2, Managing Director]; or a one-stop approach, where firms 'enter the community, they make a research contract with the University, they leave the community' [OO3, Project Manager B]. However, it is important to claim that despite the exit from the network, relations between companies and the university have not been lost. As stated by one respondent: 'Getting out was not an easy choice, but we kept the relationships and even a few contracts with the researcher groups with which we collaborated' [PP10, R&D Manager B]. Moreover, one final point should be considered: the presence of an interorganizational network between university and industry does not necessarily mean that all the university's researchers are willing to collaborate with industry.

> It often happens that firms or other partners enter the UniSMART Community with several expectations that are not always easy not to maintain. The reality is that even if our university is a generalist one, researchers are not always willing to collaborate with firms or the negotiation process is not always perceived as fair by the two parties involved [i.e. industry and university]. [OO4, Project Manager]

This may represent an impeding factor that promoters and organizers must address from a cultural and organizational perspective. Over the years, respondents recognized that such a network increasingly raises researchers' awareness about the financial and technological opportunities of collaborative initiatives with industry. While this issue did not emerge from the participants, it is widely acknowledged by the network's management bodies that constantly monitor the research groups and develop tailor made events and meetings to engage researchers and stimulate their commitment.

How do internal actors engage in university-industry interorganizational networks?

Looking at the UniSMART Community case study, we identified a set of drivers that underpin the engagement of industrial actors within the network. Those actors who were initially external become fully-fledged internal members upon entering the network. First, a formalized network as such requires the *alignment of interest between actors*. This aspect is key to enabling technology transfer initiatives. In fact, this transfer process between university and industry is an operation that creates shared value and must tend to be a win-win for all the partners involved at the value creation and value appropriation level (Chesbrough, Lettl, and Ritter 2018; Jacobides, Knudsen, and Augier 2006). One of the key challenges is to stimulate 'reciprocity between companies and the University to reach a mutual exchange of knowledge and assets from which both the parties can benefit to generate impact' for themselves and for the context in which they operate [PP7, Head of Operations]. We therefore further contribute to the insights derived from Shaikh and Levina (2019) who claimed that those networks may be alliance partners for companies if a balance of interest among the parties involved is pursued.

Second, the importance also emerged of *alignment of languages between actors*. Respondents agree that such an interorganizational network needs to have a proactive role acting as 'translators between different languages' of stakeholders [PR8, Community Manager] thus reducing 'language barriers arising from distinct terminologies and perspectives' [OO9, IP Manager B]. To facilitate this process, the team of Project Managers of the network is characterized by hybrid backgrounds in the industrial and academic fields. This leads to a beneficial effect on the network structure, whose strength directly reflects the strength of the connections across the different actors involved (Capone and Lazzeretti 2018).

Third, and last driver, our respondents agree that such an interorganizational network must be organized as a *meeting platform between different stakeholders*. Only a smooth organizational structure can act as a conduit through which knowledge flows (Simard and West 2006). It is not just a matter of enabling companies to close research contracts with the University (and vice versa), but also to build up a more diffused space for collaborative innovation (Schaeffer, Öcalan-Özel, and Pénin 2020). This may happen through networking events such as 'high-level dinners, workshops, and seminars involving prominent scientific figures from the University network' [PR5, Chief Technology Officer], as much as through recurrent meetings arranged with firms and researchers both online and in presence. Such events represented also the opportunity for participants to meet with other firms and local institutions, as well as to establish or sustain relationships with them. Furthermore, firms often come to visit universities' laboratories and researchers come to visit firms' R&D plants and headquarters. This process was managed, promoted and supervised by the network's professionals (i.e. the organizers).

Fostering technology transfer initiatives within the network

Considering our case study, we identified a set of mechanisms that can foster the emergence of technology transfer initiatives. The first approach is bottom-up. The organizers supported participants' involvement through *scouting and matching from open needs*. This aspect confirms that interorganizational networks may also be implemented to enable the emergence of relationships that attempt to solve complex issues through joint problem-solving (Dittrich and Duysters 2007; Filiou 2021; Lee et al. 2019). In several cases, the UniSMART Community became a channel used by firms to systematically access an external knowledge base, thus solving challenging issues that would not be addressed otherwise.

The second approach is top-down. The interorganizational network facilitates a *problem-oriented technology valorization*. In fact, the UniSMART Community acted as a double-sided platform, acting not only to solve companies' issues but also to promote the assets of the University in terms of knowledge, technologies, and patents. It is no accident that the promoters designed the network with an exclusive agreement to valorize IP assets of the Universities via licensing and other collaborative schemes. This combination of bottom-up and top-down approaches stimulated a *multiplier effect through different partners' involvement* in many ways. In doing so, the university leverages interorganizational network with industry here analyzed to facilitate the emergence of technology transfer initiatives in a systematic way.

In conclusion, it may be interesting to underline that the technology transfer initiatives which emerge most frequently in our analyzed network were related to contract research. While this is an approach commonly recognized in the literature (Perkmann et al. 2021; Schaeffer, Öcalan-Özel, and Pénin 2020; Zhao, Broström, and Cai 2020), we focused on the reason why those initiatives were preferred with respect to others in such a network. Our respondents pointed out that those kinds of contracts represent a more viable and easily accessible path since they are characterized by greater control and higher efficacy in terms of operability. As previously discussed, they are problem-based, solution-oriented, and often scheduled through milestones and KPIs that facilitate the achievement of the planned target. These characteristics are not usually recognized in other types of technology transfer initiatives.

The participants' patterns

Building on the prior findings that emerged from our case study and drawing on Fichter (2009) and Alberti and Pizzurno (2015), we identified and thus proposed three different patterns linked to three different kinds of participants. We related these participants' patterns according to the different frequencies of technology transfer interactions with universities (i.e. one stop or multiple) as much as to their commitment to the network (i.e. high or low). In fact, from the moment in which participants enter the interorganizational network for the first time as newcomers, their conduct inside the UniSMART Community tends to evolve over time.

The first participants' pattern is related to what we identified as *observers*. These participants are recognized to be more passive in the network's life. Those are the kinds of actors that see value only in presiding over this innovation space and being associated with the universities' innovation activities. For example, this is the case of R&D Manager E [PP14] who claimed that: 'We accessed the UniSMART Community out of curiosity, and we spent a few years passively; we believe that this community is a hot spot of innovation to be monitored'. Observers are not always easy to manage within the network. In fact, when we consider our case, one of the greatest challenges is 'to make the members firms really feel part of the UniSMART Community, sometimes it can happen that they just act as observers without being fully engaged' [OO11, Project Manager C]. Organizers recognized that one of their responsibilities is to facilitate participants' engagement process by listening to their needs and showing the potential of the network. However, our respondents consider tackling this problem to be a challenge.

The second participants' pattern we recognized is represented by the *enthusiasts*. They systematically access the university knowledge thanks to the brokering activity of the team of the networks' organizers and tend to recommend this process to other firms. Their constant involvement in the network activities leads them to often start new technology transfer initiatives.

> The recent [collaborative research] experience has been a regenerative process that we believe that also other companies should pursue. This collaboration hasn't changed the way we do business and hasn't improved the product per se, but it has undoubtedly brought a breath of fresh air, creativity, new points of view, […] something we could hardly have achieved otherwise and which we have made structural within the company thanks to UniSMART. [PP2, Managing Director]

Enthusiast participants tended to become engaged participants over time. This last pattern is typical of those firms who have greatly benefited from technology transfer initiatives with the university and now feel involved in the life of its network. Those respondents know that when they need it, they can come forward to access the knowledge and technologies of researchers through collaborative initiatives. The interorganizational network thus becomes 'a strategic ally that we know we can always count on and that is an integral part of our innovation activities as a company' [PP2, Managing Director]. This first set of findings has been schematized in Figure 1.

Discussion

Theoretical implications

Our studies present and discuss the findings, providing three theoretical implications that advance existing knowledge on technology transfer in several ways.

First, this paper contributes to the interorganizational networks literature (Ghoshal and Bartlett 1990; Park 1996) and its application in technology transfer studies (Beaudry and Kananian 2013; Boehm and Hogan 2014) by unpacking the micro-processes underpinning a university-industry interorganizational network. While prior studies overlooked approaches to foster systemic and technology-based interactions between universities and industry (Freitas, Geuna, and Rossi 2013; von Briel and Recker 2017), we reveal how universities can strategically leverage such networks to enable structured and continuous initiatives with industrial partners. Through a single case study, we provide in-depth insights into the fine-grained micro processes in science-industry interactions

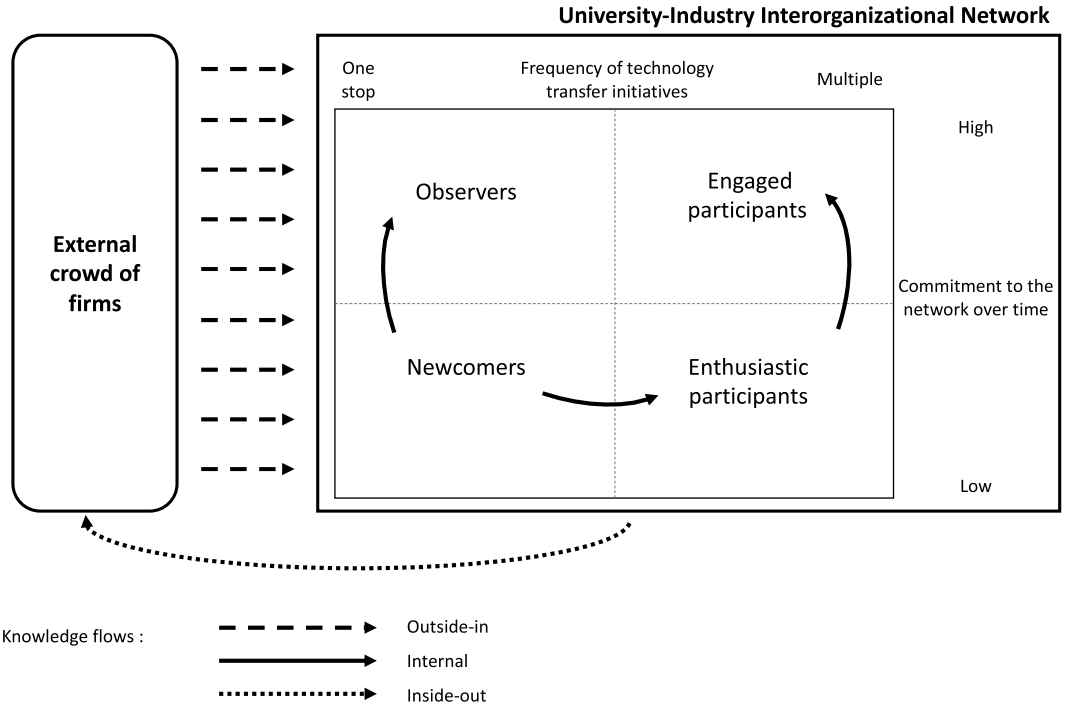

Figure 1. Findings schematization.

regarding actors, channels, and outcomes in the context of technology transfer initiatives within collaborative interorganizational settings. In particular, given the need for a better understanding of how interorganizational networks work (von Briel and Recker 2017; West and Bogers 2014) about university-industry interactions (Li-Ying, Sofka, and Tuertscher 2022; Vieira, Bonfim, and da Cruz 2021), and how they support the emergence of technology transfer initiatives through problem solving (Alexander, Miller, and Fielding 2015; Jonsson et al. 2015b), our case study shed light on this issue by identifying: (i) how does a university-industry interorganizational network work, (ii) how do external and internal actors engage with such networks, as much as (iii) the diverse participants' patterns that characterize these interactions.

Second, while similar interactions are not new to the literature, scholars mostly addressed them within specific and limited timeframes (e.g. Alexander, Miller, and Fielding 2015; Angrisani, Dell'Anno, and Hockaday 2022). Prior studies mostly focused on categorizing a set of evolutionary and subsequent phases that underpin university-industry collaboration from the early to mature stage (O'Dwyer, Filieri, and O'Malley 2023; Thune and Gulbrandsen 2014). In contrast, we shift the focus toward the underlying mechanisms that sustain these interactions over time, to avoid sporadic or unsystematic collaboration dynamics (Baleeiro Passos et al. 2023). Building upon the prescriptions of other longitudinal case studies in innovation management (Dąbrowska, Lopez-Vega, and Ritala 2019; Pinarello et al. 2022), we considered six years of formal and structured interactions between these different players, analyzing the reciprocal contributions of partners within the innovation process (Audretsch and Belitski 2021; Brown and Hagel 2006).

Through this longitudinal lens, our work challenges the adequacy of linear process models often proposed to guide such collaborations (Philbin 2008), and instead highlights the complex, dynamic, and interrelated nature of the micro processes that characterize such interorganizational networks. In fact, rather than on a single process, we focused on the evolving nature of a set of micro processes to enhance a more comprehensive understanding of university-industry interactions in a

collaborative context of this sort (Dodgson, Gann, and Salter 2006; Huizingh 2011; Tolin and Piccaluga 2025). In doing so, we provide empirically grounded insights that enhance the actionability and explanatory power of previous contributions on this topic (Alberti and Pizzurno 2015; Elmquist, Fredberg, and Ollila 2009; Fichter 2009).

Third, acknowledging the need to integrate the technology transfer perspectives from both universities and external actors (Huggins, Prokop, and Thompson 2020; Zhao, Broström, and Cai 2020), we interviewed different partners that engaged with the University. While prior research has primarily focused on TTOs, often adopting a university-centric perspective (Muscio 2010; Villani, Rasmussen, and Grimaldi 2017), our study examines a different, underexplored type of intermediary by identifying diverse participant typologies based on the frequency and nature of their involvement in technology transfer initiatives. Through this approach, we contribute to the literature on technology transfer intermediaries by uncovering the inherent granularity and complexity that characterize interorganizational networks – specifically in terms of the distinct roles of promoters, organizers, and participants (Alberti and Pizzurno 2015; Fichter 2009).

This case study does not suggest that one intermediary is better than another; it underscores the importance of supporting a pluralistic ecosystem of intermediaries – including both TTOs and interorganizational networks – that can coexist and address specific challenges in facilitating university-industry interactions. From an outcome perspective, the presence of an interorganizational network as such may foster the emergence of technology transfer initiatives such as collaborative research, contract research, and innovation consulting (Perkmann et al. 2021; Schaeffer, Öcalan-Özel, and Pénin 2020) that complement traditional channels more commonly implemented by TTOs, such as spin-off creation and technology licensing (Zhao, Broström, and Cai 2020).

Practical implications

On the other hand, in terms of practical implications, we believe that a case study of this sort may assume relevance both for universities and industries that, by looking at the evolution of this peculiar interorganizational network over time, can better understand its role as a vehicle for the emergence of technology transfer initiatives. This study provides practical insights in terms of drivers that enhance actors' engagement within the interorganizational network such as the alignment of interests and languages between actors or the development of the network as a meeting platform between the different stakeholders involved. These aspects, combined with prescriptions from studies that look at similar phenomena (e.g. Crupi et al. 2021; Striukova and Rayna 2015), may represent the starting point for universities that aim to set up and leverage such networks in their local contexts and for firms' managers that want to understand whether a network of this sort may be a solution to solve problems or to scout innovation through collaborative approaches.

While it is true that technology transfer initiatives differ across countries according to their unique characteristics, the underlying rationale remains consistent across all national contexts where they are implemented (i.e. identify approaches to engage industrial partners in continuous and systematic interactions) (Freitas, Geuna, and Rossi 2013; Levy, Roux, and Wolff 2009). This is why even if our study primarily focuses on the Italian context, it offers valuable insights applicable to any context where universities struggle to engage in such interactions. In particular, the Italian case holds strategic significance for universities in other European and international contexts with technology transfer organizational infrastructures whose development is still in its early stages.

Conclusion

Our work contributes to understanding how universities may leverage an interorganizational network with industry to foster technology transfer initiatives. We carried out a six-year longitudinal case study on the UniSMART Community, the interorganizational network of the University of Padova. We built upon a set of primary sources (i.e. 38 interviews) that we inductively coded and

triangulated with multiple secondary sources. The research led us to identify how such a network works, how external actors engage in university-industry interorganizational networks, how internal actors engage within the network, and how to foster technology transfer initiatives in such a context. These elements provide a solid basis to understand and clarify the participants' pattern. Our case study provides theoretical and practical insights that may be of particular interest to scholars and professionals working in technology management and dealing with university-industry interactions.

This research is characterized by a set of limitations that may represent avenues for future research. First, it is unwise to generalize from the inductive approach we adopted in our single case study. For this reason, we argue that further empirical research should be conducted under a multiple-case design, comparing our case with other university-led networks of similar nature in different international contexts. Since the challenge of one-off and sporadic technology transfer interactions remains a global concern (Freitas, Geuna, and Rossi 2013; Levy, Roux, and Wolff 2009; Orazbayeva and Plewa 2022), different contexts may require specific actors or actions to foster the success of such networks. It would also be insightful to investigate whether a different interorganizational network promoter, perhaps from the industrial side, would differently manage the process and facilitate the emergence of technology transfer initiatives. While our work does not account for comparison among participants operating in the same industry, such an industry-led network may enhance firms' cross-comparability over time. Second, further studies may also compare different networks of this sort with quantitative research designs. Even if our work sheds light on the 'how' side of the coin, we argue that still little is known in terms of the performance and impact of initiatives implemented in these collaborative contexts. In conclusion, we believe that future qualitative research may investigate the limits of those networks. Even if our work assesses the drivers and mechanisms that underpin them, further research is required to better comprehend what prevents firms from engaging in those collaborative initiatives with universities, or what inhibits passive participants from actively participating, as much as how different stages of collaboration in which each company finds itself may affect the overall interaction in such contexts.

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Appendix: Interview protocol.

Interview protocol – *promoters*

- Background information about the respondents and their role in the organization.
- Background information about the organization and its technology transfer structure and activities.
- Are you familiar with the concept of interorganizational networks?
- Please, describe the story of the UniSMART Community.
- Please, describe how the UniSMART Community works.
- Please, describe how the UniSMART Community is organized and evolved over time.
- How do firms engage with the UniSMART Community? Please, identify the drivers and the barriers.
- How do firms engage with the University in such a network? Please, identify the drivers and the barriers.
- Please, identify and discuss practical cases of technology transfer and engagement in which you have been involved as promoters.

Interview protocol – *organizers*

- Background information about the respondents and their role in the organization.
- Background information about the organization and its technology transfer structure and activities.
- Are you familiar with the concept of interorganizational networks?
- Please, describe how the UniSMART Community works.
- Please, describe how the UniSMART Community is organized and evolved over time.
- How do firms engage with the UniSMART Community? Please, identify the drivers and the barriers.
- How do firms engage with the University in such a network? Please, identify the drivers and the barriers.
- Please, identify and discuss practical cases of technology transfer and engagement in which you have been involved as organizers.

Interview protocol – *participants*

- Background information about the respondents and their role in the organization.
- Background information about the organization and its technology transfer structure and activities.
- Are you familiar with the concept of interorganizational networks?

- How did you get in touch with the UniSMART Community at the beginning?
- What are the strengths and weaknesses of such a network?
- Why are you still participating in such a network and why not?
- If you have been involved in the UniSMART Community for more than two years, how has the network evolved over time?
- Please, identify and discuss practical cases of technology transfer and engagement in which you have been involved with the University as a firm.