

The SMEs digital entrepreneurial ecosystem: a matter of trust¹

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Objectives. *The paper provides evidence on how the mechanisms of Digital Entrepreneurial Ecosystems (DEEs) can affect the willingness to invest in digital technologies among Small and Medium-sized Enterprises (SMEs).*

Digital technologies are recognized as a new strategic imperative that is changing the basis of firms' competitive advantage. The new advanced and connected technologies are affecting business processes and customer experiences with the aim of meeting business dynamics and new market requirements (Fitzgerald et al., 2013).

However, SMEs remain still cautious in adopting the solutions offered by digital technologies (Schröder, 2016). Collaborative networks may represent an enabler for the Fourth Industrial Revolution (Camarinha-Matos et al., 2017), especially for SMEs and micro-enterprises. In fact, new ways of creating and offering value through ecosystems that go beyond individual value chains are continuing raising (Ibarra et al., 2018). In such context, Entrepreneurial Ecosystems (EE) by favouring interactions among different actors (Mack and Mayer 2016) may support the adoption of digital technologies in the so-called digital EE (Cetindamar et al., 2020; Elia et al., 2020).

Nevertheless, the network of interactions of individual elements in the EE has not been sufficiently explored (Motoyama and Watkins 2014). In addition, the specific mechanisms through which the ecosystems influence entrepreneurs are not clearly stated (Roundy and Fayard, 2018). Referring to digital technologies according to Elia et al., 2020, there is limited literature discussing the real impact of digital technologies and collaboration on the overall entrepreneurial process. Thus, we try to overcome the mentioned gaps by considering the mechanisms of a DEE to identify which are the enabling factors that incentivize SMEs to adopt and invest in digital technologies by considering the digital actors (1), digital motivations (2), digital activities (3) and digital organization (4) of the DEE. The concept of Entrepreneurial ecosystems (EE) has emerged during the last few years (Stam 2015) and has attracted the interests of scholars and policy makers thanks to its positive impact on venture creation and innovation outcomes of regions (Cunningham et al. 2018). In general, an EE can be described as a system that supports entrepreneurship (Isenberg, 2010) by favouring interactions among different actors (Mack and Mayer 2016).

The purpose of the EE is twofold. On one hand, the EE is called to generate value for the whole ecosystem and on the other distribute the value created among the members of the ecosystem (Clarysse et al. 2014). EEs are becoming even more relevant with the arising technology paradigm. The new technological paradigm, referred to also as Industry 4.0, is enhancing the potential of collaboration through collective intelligence addressed to design and launch more robust and sustainable entrepreneurial initiatives. In this scenario, Elia et al., (2020) identified four dimensions associated to digital activities (what), digital actors (who), digital motivations (why), and digital organization (how), examined in nine cases. Their cases included global companies and networks, as IBM Inn. Jam, Startup Compete, F6S, InnoCentive, iBridge Network, Kick starter, Uber, Airbnb, Apple St. Nevertheless, as underlined by Elia et al., 2020, there is still limited literature discussing the real impact of digital technologies and collaboration on the entrepreneurial process.

¹ the research is “work in progress”

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These aspects are crucial for SMEs, which remain still cautious in adopting the solutions offered by digital technologies (Schröder, 2016). However, the introduction of digital technologies can affect SMEs' ability to achieve and sustain a competitive advantage over time (Lanzolla and Frankort, 2016). It is not a question of whether SMEs should introduce Industry 4.0 or not, but rather how they can do so as quickly as possible to maintain or achieve a competitive advantage (Matt et al. 2020). According to Matt et al. 2020, financial resources are among the main requirement for introducing the new technological paradigm among SMEs together with the need to establish partnerships with universities, research institutions, and collaboration with customers and suppliers.

Therefore, SMEs' involvement in an EE may be determinant for the adoption of digital technologies as a result of an integration strategy based on cooperation with other firms along the value-added chain (Müller et al., 2017).

In this context, intermediary figures could connect companies to external sources and mediate relationships with these actors (Nambisan et al., 2012). Therefore, they are recognized as central for creating and maintaining a successful innovation ecosystem (Sieg et al., 2010). Such innovation intermediaries could play an important role in managing the networking activities among different organisations (Klerkx and Leeuwis, 2009). Moreover, they could facilitate the identification of external knowledge providers and make their knowledge accessible to other participants of the network. Intermediaries could act as agents that improve connectivity within and among innovation networks (Stewart and Hyysalo, 2008).

As proximate actors, intermediaries could interact more easily promoting both interorganizational collaboration and innovation (Villani et al., 2017). Three main types of innovation intermediaries have been identified by the literature. Intermediaries can be involved in problem solving, technology transfer mechanisms or act as coordinators for networking activities in an innovation system (Agogué et al., 2017). Moreover, projects which involve the presence of intermediaries can be multi-dimensional, comprising both financial and non-financial gains (Huzingh, 2011). More specifically, knowledge-based practices adopted by innovation intermediaries can generate financial and non-financial value from collaborative projects (Martin-de Castro, 2015). However, one of the main managerial challenges of intermediaries is that of creating trust among participants making sure to coordinate contributors, especially when the output of collaboration is uncertain (Fawcett et al., 2012).

In this sense, Barge-Gil (2010) found that forcing firms to collaborate can reveal to be counterproductive and can create a climate of mistrust for participants. On the other hand, Lee et al. (2010) discussed the potential negative effects of cooperation in the context of SMEs when there is a lack of financial resources available. However, at the same time, there is a lack of understanding of what enables intermediaries to generate value for themselves in collaborative innovation (De Silva, et al., 2017). Indeed, publicly funded intermediaries perform essential inter- and intra-ecosystem connective functions, but system fragmentation and long-term perspective remain persisting policy challenges (Bramwell, et al. 2019). These issues are important in policy terms for understanding how innovation intermediaries may be used to leverage benefits for the wider national or regional innovation systems as well as for their clients (De Silva, et al., 2017).

In particular, the emerging case of European Digital Innovation Hubs (DIHs)², whose mission is to act as intermediaries in a regional ecosystem may be relevant for understanding how relationships are managed within a DEE, even in the case of an uncertain collaborative output. DIHs. The European Commission is investing in these structures as a means to support businesses in their digital transformation and is promoting cooperation among them. DIH is one of the pillars of the Digitising European Industry (DEI) initiative, which was launched by the European Commission in 2016 to reinforce the EU's competitiveness in digital technologies. DIHs act as a one-stop-shop, serving companies within their local region and beyond to digitalise their business. They can focus on a specific sector or technology to respond to regional digital needs and to build synergies with regional smart specialisation strategies.

Methodology. We draw the study relying on the action research methodology, involving observations, direct participation, document analysis and the direct involvement of a researcher. The latter aspect allowed to enhance through practical involvement of the researcher in the knowledge acquisition process (Siggelkow, 2007; Yin, 2009; Ripamonti et al., 2016). We considered the action research methodology the best option to build the case study since on DEE since the entire process of network building is based upon the collaborative interaction between the professional researcher and the local stakeholders (Greenwood, 2018). Based on a DEE from the region Marche in Italy, we collect information on the mechanisms triggering the investment in digital technologies by SME. The mechanisms were investigated by considering as a framework, the model presented by Elia et al. (2020). Thus, digital actors (1), digital motivations (2), digital activities (3) and digital organization (4) were examined. Overall, the entire period of participation and direct observation lasted 31 months. During this period, the professional researcher acted as a facilitator for networking activities among actors of the DEE, driving the creation of more interactive approaches in the EE (e.g., local entrepreneurs, innovation brokers, research centers, and professional associations). The researcher also collaborated directly in the entrepreneurial project definition. As a last step, the research group performed, codified, and analysed nine in-depth semi-structured interviews, email correspondence and documents. The purpose of the interviews was to determine the final individuals and organizations viewpoint according to which derive the contributions of the present case. The development of the study follows an iterative approach (Lofland, Snow, Andersen, & Lofland, 2005) and covered three main steps used in developing the narrative: identifying the context and the digital

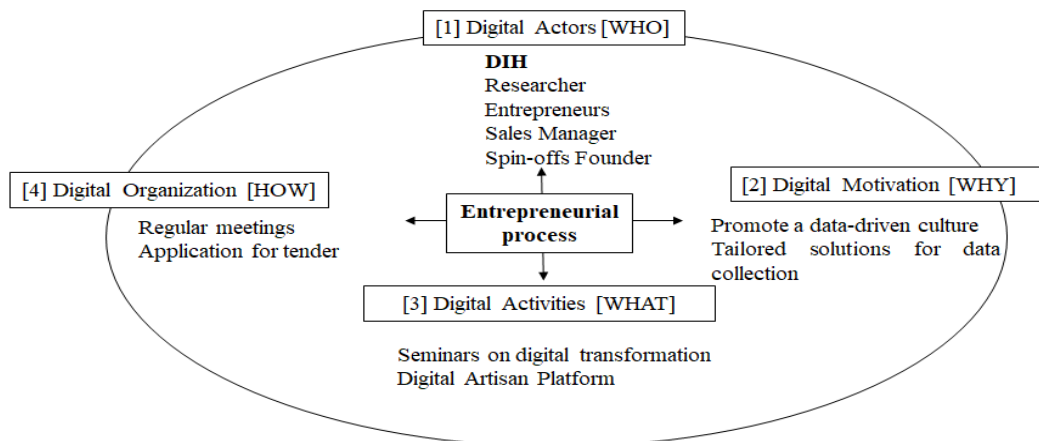
² Digital Innovation Hubs in the Smart Specialization Platform: <https://ec.europa.eu/digital-single-market/en/digital-innovation-hubs>

needs to address in performing the action, finding the right intermediaries to build the ecosystem and involving the DIH as the knowledge broker, developing the core of the digital activities through the creation of the Digital Artisan Project. Accordingly, we developed the narrative following the four dimensions associated to digital actors (who), digital motivations (why), digital activities (what) and digital organization (how) with the aim of providing evidence on a DEE as discussed by Elia et al., (2020).

Findings. The study provides insights into the digital motivations, activities, and organization of the DEE, explaining how intermediaries can gain trust among different digital actors. Trust reveal to be the enabling factor to make sure that SMEs were willing to invest in digital technologies. The trustful process was ensured by the guidance of the DIH, which oversaw the digital organization, linking actors and processes into a proper organizational model. Based on the evidence captured through the case of the DEE selected, it is possible to provide a representation of the DEE as presented in Figure 2, through the four elements described by Elia et. 2020. Contrary to the model of Elia et al. 2020, the digital actors are placed in the first step. Indeed, the digital actors had a triggering role in the development of the DEE right from the start. This is especially true considering the role of the intermediary, DIH, who identified the digital motivation of the DEE in terms of promoting a data driven culture among SMEs by creating tailored solutions for collecting data on their production processes. Even if the technology was still at an exploratory stage, the SMEs decided to invest in its development, partially supported by a financial aid, which was identified by the DIH. The digital motivation of the DIH was already part of its own mission aimed at supporting the digital transformation of SMEs in the region. On the other hand, the provider had the motivation for collecting user cases to define and export its business model. Contrary to these two digital actors, the digital motivations were not initially perceived by the SMEs who were not aware of the potential of digital technologies. At this stage, the digital organization was set.

The DIH promoted the initial digital activities aimed at making SMEs aware of their digital motivation and thus of their compelling new to adopt digital technologies. Once that the SMEs recognized their need for approaching digital advice, the activities were focused on reinforcing their commitment towards the project based on meetings between all digital actors involved. Overall, trust, as stated by the interviewees, was also the main driver that led the provider to contact the DIH.

Fig. 1: The Digital Entrepreneur Ecosystem for SMEs



Source: Authors' elaboration based on Elia et al. 2020

Research limits. Being based on a single study, results cannot be generalized. Therefore, further research should include other examples of digital EE where intermediaries, SMEs and micro enterprises are included to understand the relationships among the different digital actors. Together with qualitative approaches, based on semi-structure interviews, observation and direct involvement of the researcher, quantitative studies on a larger scale may further contribute to the emerging literature on DEE. In this sense, it would be necessary to analyse in a structured way the perspectives of all the different digital actors involved, providing insight on their digital motivations, activities and organization, and in particular on the role held by intermediary actors in gaining trust.

Practical implications. The study finds evidence that collaborative approaches within DEEs when guided by a trustful intermediary are crucial for encouraging the investment in digital technologies among SMEs.

The DEE confirms that intermediaries can support the creation and development of a successful innovation ecosystem (Sieg et al., 2010) by connecting companies, as SMEs and micro enterprises, to external knowledge sources (Nambisan et al., 2012). As a matter of fact, the digital EE, under study in the Italian region of Marche, by favouring interactions among different actors (Mack and Mayer 2016) was able to promote the willingness to invest in digital technologies among SMEs and micro enterprises, which are known to be reluctant in their introduction (Schröder, 2016).

Specifically, trust was gained for supporting the introduction of a digital technology able to collect data on firms' production processes. This was possible even if the technology was still at an experimental stage and the provider still needed to develop user cases to export its business model. As outlined by interviews, the trustful relationship was ensured by the intermediary actor, in this case represented by the DIH. Without the involvement of the DIH, the SMEs would have not invested in a technology for collecting data on their production processes.

The intermediary actor oversaw the overall digital organization, linking actors and processes into a proper and trustful organizational model. Furthermore, the DIH together with the researcher conducted a set of digital activities for creating awareness in digital technologies among SMEs, which needed to understand its potential and a scouting process for gaining financial support through the application to a tender. Therefore, even if one of the main challenges of intermediaries found in a EE is that of creating trust among participants and to coordinate contributors when the output of collaboration is uncertain (Fawcett et al., 2012), a sample of entrepreneurs decided to invest in the new digital technology trusting the DIH. This aspect confirms that if there is a reliable intermediary, even when the outcome of the collaboration is not sure, trust can be gained, even among SMEs and micro enterprises.

By considering the experience of a DEE including a DIH as the intermediary actor, the study recognizes the importance of policy makers in defining strategies for SMEs' digital transformation. In particular, the representation of the evolution of DEE may be a useful roadmap able to assist policy makers in the definition of future action plans for promoting digital technologies among SMEs. Overall, the study proves that collaborative approaches driven by DEEs are crucial for encouraging the adoption of digital technologies among SMEs, which constitute a vital economic resource for the European economic system. In addition, our study shows that DIHs might be able to help SMEs benefit from the Industry 4.0 perspective connecting digital actors, through informal and informal mechanisms. The identification of best practices as the one presented could be useful to define common tools and programmes to enhance the level of readiness of SMEs towards Industry 4.0. Therefore, further studies could examine and compare the mechanism adopted by DIHs, whose mission is to promote the adoption of digital technologies among SMEs.

Originality of the study. The paper considers the enabling role that digital intermediaries, as the European DIHs, may hold for incentivizing SMEs' willingness to invest in digital technologies within the fourth industrial revolution.

The action research methodology through the direct involvement of the researcher made it possible to analyse in depth the mechanisms that allow to influence and gain trust among entrepreneurs (Roundy and Fayard, 2018). Therefore, our study contributes to the literature on EE by considering the interactions of individual elements of the EE (Motoyama and Watkins 2014) and the specific mechanisms through which the ecosystems are able to influence entrepreneurs decision-making (Roundy and Fayard, 2018). Moreover, by considering the adoption of digital technologies, we contribute to understanding the impact that both technologies and collaboration could have on the entrepreneurial process (Elia et al. 2020).

Key word: Digital Entrepreneurial Ecosystem; Digital Innovation Hubs; Industry 4.0; Collaboration

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