Exploring the dynamics of open innovation and artificial intelligence: A focus group study with experts

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Abstract

This paper explores the growing importance of artificial intelligence (AI) and its integration into open innovation, drawing upon the theoretical framework proposed by Broekhuizen et al. (2023). We adopted an exploratory qualitative approach—focus groups—and applied the model within a specific regional setting with the aim of understanding how experts perceive and implement AI applications to support open innovation practices. The findings confirm the growing role of AI as an enabler of open innovation, while also highlighting significant heterogeneity in how organisations adopt and interpret it. The nine functions that emerged from the focus groups show that AI is not only perceived as an operational tool but also as an object of governance, mediation, and ethics. The research serves both theoretical and managerial implications: theoretically, it enriches our understanding of the AI–open innovation intersection by revealing that AI's roles go beyond technical functions, encompassing symbolic, regulatory, and ethical dimensions; managerially, it highlights how SMEs should adopt incremental AI strategies that emphasise small-scale experimentation, inhouse training, and the co-development of shared platforms with other ecosystem stakeholders.

Keywords: open innovation; artificial intelligence; AI; innovation ecosystem; digital transformation; focus group

1. Introduction

The rising prominence of the open innovation paradigm reflects a growing interest in collaborative ecosystems, where co-creation among heterogeneous actors offers an effective response to the increasing complexity and dynamism of today's economic and technological environment. The open innovation approach is based on the joint exploitation of resources inside and outside the organisation, and favours the integration of ideas, knowledge, processes and technologies from multiple and complementary sources. Open innovation, as according to Deloitte (2023), derives advantages and its effects are evident in transforming innovation processes and strengthening the competitive capacity of companies. In this regard, innovation ecosystems are conceived as fertile contexts where economic, financial and social benefits can be achieved for all stakeholders (McKinsey & Company, 2023).

According to the Open Innovation Report 2023, the uptake of open innovation practices is significantly increasing: 72% of European companies have initiated collaborations with start-ups and 50% have entered into partnerships with other entrepreneurial actors (Sopra Steria, 2023). Compared to the closed and internal model, open innovation is distinguished by the inclusion of a variety of external actors - such as universities, research centres, start-ups, customers, suppliers and even competitors - in the innovation generation and development process. This allows for more agile and strategic access to skills and technologies not immediately available within the organisation.

In parallel, digital transformation is acquiring an increasingly central role in the redefinition of business strategies, pushing companies to integrate new technologies into their processes with the aim of increasing their efficiency, productivity and sustainability (Statista, 2024). As such, the integration of AI technologies into organisational processes is broadly recognised as a key stage of development for progression digital transformation initiatives. In this scenario, artificial intelligence (AI) is one of the most relevant technologies that can strengthen and enhance the dynamics of open innovation. From predictive analytics through natural language processing and machine learning to automation systems, the multiple applications of AI make it a strategic lever for innovation and at the same time pose fresh challenges, mostly through the evolution of job functions and the need for an increasingly specialisation of skill sets (Statista, 2024).

Although the relevance of open innovation and AI has been acknowledged in previous studies, there is still a limited qualitative understanding of these phenomena, as highlighted by Anchayhua et al. (2025). For this reason, it appears interesting to explore experts' viewpoints with the aim of understanding in greater detail how such phenomena are impacting the socio-economic and technological context of the Lazio Region. By engaging stakeholders with a greater knowledge base, broader contextual understanding of the opportunities and challenges associated with open innovation and AI will be identified in this regional context.

2. Theoretical background

Over the past two decades, open innovation has significantly reshaped the way organisations develop and bring novel ideas to the market. This concept, which was originally coined by Chesbrough in 2003, highlights the limitations related to the traditional "closed" innovation model, where R&D are kept strictly internal and intellectual property is tightly controlled. On the contrary, open innovation promotes the purposeful use of external knowledge sources alongside internal efforts to accelerate innovation and adapt to rapidly changing environments (Chesbrough & Appleyard, 2007). Such a shift has led firms to embrace collaboration with a broad set of actors, involving startups, universities, institutions, research centres, suppliers, and customers, thereby transforming the innovation process into a more dynamic and networked process (Bogers et al., 2018; Deloitte, 2023). Adopting an ecosystem-centric perspective highlights how innovation has evolved into a more collective endeavour by involving a broad spectrum of participants from across organizational and sectoral boundaries (Dodgson et al., 2006). The concept of open innovation, once largely associated with industrial contexts, now extends far beyond its original domain and influences a broad range of sectors like the public sector (Mergel, 2021), financial services (Fasnacht & Fasnacht, 2018), museums and exhibition spaces aimed at enhancing visitors' experiences (García-Muiña et al., 2019), tourism (Hermawati et al., 2020), as well as the power and energy sector (Greco et al., 2017).

This shift from closed to open innovation models is evident in both large corporations and small and medium-sized enterprises (SMEs), although their motivations and obstacles diverge rather sharply. Large firms, typically equipped with in-house R&D resources, have historically leaned toward closed innovation. Yet, as market demands grow more complex and speed becomes crucial, these organisations increasingly adopt hybrid models. For example, Mitsubishi Electric's strategy blends internal innovation and collaborative standard-setting, balancing the protection of intellectual property with the need to supplement internal resources (Kajiura, 2012). In addition, large firms frequently harness advanced information technology to coordinate both closed and open innovation processes, adapting their strategies to fit organisational priorities (Andrade-Rojas et al., 2024). In contrast, SMEs often lack the capacity to innovate solely through internal means. Instead, they depend heavily on

open innovation networks and partnerships to access external knowledge, which is essential for their survival and growth. Empirical studies, such as those focusing on industrial SMEs and technology firms in South Korea, underscore the significance of these collaborations (Roberts and Spedale, 2025; Heusler et al., 2024; Grama-Vigouroux et al., 2020). While SMEs can derive significant advantages from AI-enabled open innovation, they also contend with ongoing resource constraints, making robust organisational capabilities and supportive innovation ecosystems vital (Jin et al., 2022; Hitchen et al., 2017).

Across both organisational types, cultural and structural barriers, like the "Not Invented Here" syndrome and differing attitudes toward risk, can impede openness (BurgerHelmchen, 2024).

Artificial intelligence (AI) has significantly altered the landscape of open innovation across organisations, regardless of the enterprise's size. AI enhances firms' abilities to absorb and process external knowledge, accelerating innovation cycles and enabling more agile decision-making (Bahoo et al., 2023). This becomes particularly important in rapidly changing environments, where the ability to quickly identify and seize emerging opportunities can be critical (Sahoo et al., 2023). AI-powered platforms and ecosystems are facilitating more seamless collaboration - firms can now engage with external partners more effectively, as exemplified by Chinese open innovation platforms and Haier's micro-community approach (Cricchio et al., 2025; Li et al., 2024; Steiber and Alvarez, 2024). However, realizing these strategic benefits depends on the presence of robust organisational support structures. Essential factors include digital knowledge management, a culture that supports openness to new ideas, and empowering employees to contribute meaningfully. This is especially pertinent for SMEs, which often lack formal innovation infrastructures and therefore require tailored support to fully leverage AI's capabilities (Naruetharadhol et al., 2022; Jin et al., 2019; Radziwon and Bogers, 2019). Furthermore, AI augments established innovation methodologies such as crowdsourcing, enabling more sophisticated filtering and learning processes that expand firm's capacity to utilise external ideas (Füller et al., 2021). Nevertheless, collaborative innovation in AI remains complex. For instance, while university-industry partnerships generate a high volume of AI-related patents, these patents typically have less impact than those developed independently by firms or academic institutions. This highlights some of the challenges and nuances associated with AI as a general-purpose technology (Messeni Petruzzelli et al., 2023).

Following the definition of the key theoretical foundations of open innovation - considering both large enterprise and small and medium-sized enterprise - and having acknowledged the growing significance of artificial intelligence in these processes, this study draws upon the theoretical framework proposed by Broekhuizen et al. (2023). Their framework presents a 3x3 matrix that aligns the three stages of open innovation (i.e. initiation, development, realization) with three management functions of AI (i.e. mapping, coordinating, controlling) (Table 1). This approach seeks to clarify how various AI applications can augment or automate human tasks, thereby addressing persistent challenges in open innovation. In our study, we focus on understanding how enterprises are integrating AI into open innovation practices. Specifically, we examine AI's role in facilitating collaboration, managing risks, safeguarding knowledge and data, and identifying new opportunities.

		AI functions		
		Mapping	**Coordinating**	**Controlling**
Open innovation stages	**Initiation**	*I – AI as scout*	*II – AI as matchmaker*	*III – AI as forecaster*
	Development	*IV – AI as cartographer*	*V – AI as conductor*	*VI – AI as whistleblower*
	Realization	*VII – AI as vanguard*	*VIII – AI as broker*	*IX – AI as custodian*

Table 1: 3x3 Matrix (Broekhuizen et al., 2023)

It is therefore of particular interest to investigate this phenomenon through an exploratory qualitative approach (Anchayhua et al., 2025) - namely, focus groups - by applying this model within a specific regional and contextual setting. With this in mind, we pose the following research question (RQ):

RQ: How do experts consider and implement AI applications to support open innovation practices?

3. Methodology

3.1 Materials and methods

For this study we employed focus groups as the primary research method with the aim of interviewing innovation experts from the Lazio Region. In this view, our goal was to gain a deeper understanding of how open innovation practices and emerging technologies, especially artificial intelligence, are being adopted and developed within the regional entrepreneurial ecosystem.

Focus groups operate as a qualitative research tool where participants engage in collective dialogue, allowing for the emergence of rich insights through shared experiences and perspectives (Morgan and Krueger, 1998). Each session commenced with a concise presentation that clarified the study's objectives and anticipated outcomes. This introductory segment explained the underlying rationale of the research, emphasizing its relevance for participating organizations. Key themes included the integration of artificial intelligence and open innovation within regional business environments, the significance of collaboration and trust within innovation networks, and the strategic impact of digital transformation at the local level. The primary goals of the focus groups were to identify both challenges and opportunities unique to the Lazio Region, and to gather expert perspectives regarding the application and limitations of AI as a driver of innovation. Insights generated during these discussions also informed the development of interview protocols for subsequent engagements with managers from small and medium-sized enterprises in the Region.

The focus group sessions, conducted online on June 5th, followed a structured set of questions grounded in the theoretical framework outlined by Broekhuizen et al. (2023).

These questions were specifically crafted to prompt participants to reflect on key themes such as innovation, technology adoption, and inter-organizational collaboration. Each session, conducted in English, lasted roughly three hours. A trained moderator led the discussions, maintaining alignment with central topics and encouraging engagement, while an assistant managed note-taking and logistical matters. The first session included five participants, while the second comprised two.

3.2 Sample

The sample consisted of seven enterprises which exhibited a heterogeneous mix of size, sector, and revenue. To guarantee a diversity of perspectives and a multidisciplinary approach, the selection was based on strict criteria: interviewees needed demonstrable expertise in innovation and digital transformation. The sample's varied backgrounds, sectors and organisational sizes were intended to provide a comprehensive and multidimensional understanding of the subject matter. Most participants (71.4%) belonged to small enterprises with fewer than 50 employees, medium enterprises accounting for 14.3%, and large enterprises making up the remaining 14.3%. This distribution indicates that there is an overwhelming representation of smaller firms in the regional innovation space. With respect to sectoral association, the sample included firms in manufacturing (28.6%), services (28.6%), technology (14.3%), marketing and communication (14.3%), and food and beverage (14.3%), suggesting a diversified yet relatively balanced representation of industry sectors. With respect to annual revenue, almost half of the enterprises (42.9%) had revenue below 1 million euros; 28.6% had revenues of between 5-20 million euros; and 28.6% had revenues greater than 20 million euros. No firms had revenues of between 1 and 5 million euros. This profile indicates that the sample included mainly small firms, engaged in multiple sectors, and were young in terms of finances (Table 2).

Gender	n (%)
Male	3 (42,9%)
Female	4 (57,1%)
Enterprise	
Small enterprise (< 50 employees)	5 (71,4%)
Medium enterprise (50-250 employees)	1 (14,3%)
Large enterprise (> 250 employees)	1 (14,3%)
Sector	
Manufacturing	2 (28,6%)
Services	2 (28,6%)
Technology	1 (14,3%)
Marketing & communication	1 (14,3%)
Food & beverage	1 (14,3%)
Revenue	

< 1 million 3 (42,9%) 1 – 5 million	0
5 – 20 million	2 (28,6%)
> 20 million	2 (28,6%)

Table 2: A socio-demographic profile of focus group participants (n =7)

4. Results

In this section we present the findings emerging from a series of questions posed to the sample, structured around the theoretical model developed by Broekhuizen et al. (2023) (Table 3 and Figure 1).

Phases	**Clusters**	**Respondents**
I – AI as scout	1. Opportunity identification through AI	R1, R4
	2. Partner discovery and network expansion	R1, R5
	3. Data analysis and scenario simulation	
	4. AI integration in business tools	R2, R3
		R4, R5
II – AI as matchmaker	1. AI for streamlining internal coordination	R3
	2. AI-enhanced traditional coordination tools	
	3. AI for communication efficiency	R2, R5
	4. AI in balancing remote access and cybersecurity	
	5. Limited collaborative AI experience	R2
	6. AI-generated outputs supporting coordination	R3
		R5
		R6

III – AI as forecaster	1. 2. Human supervision and strategic judgment 3. Automation and early warning systems 4. Financial and credit risk management Predictive monitoring and pattern recognition 5. Regulatory and product safety compliance	R1, R3 R2 R4 R5 R6
IV – AI as cartographer	1. Data security and confidentiality 2. Culture of data and openness 3. Role of AI as enabler 4. Human oversight and legal frameworks	R3, R4, R5, R6, R7 R1, R2, R5, R6 R1, R2, R5, R7 R2, R4, R6
V – AI as conductor	1. Legal and authorial uncertainty 2. Private AI and internal frameworks 3. Trust, fear and openness dilemma 4. Technical solutions (blockchain/NDA) 5. Strategic value of data	R1, R2, R3 R2, R4, R5 R1, R2, R3 R1, R4, R5 R2, R5
VI – AI as whistleblower	1. Ethics, bias, and social impact 2. Need for regulation and common frameworks 3. Transparency, human oversight, accountability 4. Pluralism in technology and avoiding monopolies 5. Education, certification, and internal ethics 6. Limitations of control and guarantees	R1, R3, R5 R2, R3, R6, R7 R1, R2, R6 R1, R2 R6, R7 R4, R5, R7
VII – AI as vanguard	1. Process improvement 2. 3. Challenges and difficulties	R2, R3, R4, R5, R6, R7 R1, R3, R4, R5, R6, R7

	Strategic and cultural issues	R1, R3, R5, R7
VIII – AI as broker	1. Operational optimisation	R2, R7
	2. Collaboration and networks	R1, R2, R4
	3. Human role and ethics	R2, R3, R4
	4. Strategic matching	R1, R3, R5
IX – AI as custodian	1. Scepticism and regulation need	R1, R2, R3, R5, R7
	2. AI as a monitoring tool	R6
	3. No relevant IP to protect	R7

Table 3: Authors' own elaboration based on Broekhuizen et al. (2023)

The first area of investigation - *AI as scout* - aimed at discovering how AI can be a valuable instrument for finding new opportunities and partners. The interviewees described how AI is seen as a transformational and operational improvement. The first theme to emerge was opportunity identification through AI, as participants such as R1 stated, "*opportunities emerge across all organisational areas—from manufacturing to HR—by addressing inefficiencies and waste*." R4 agreed and explained that by relying on an AI-system monitoring mobile network signals she was able to, "*identify clients we didn't even know existed and sign contracts with them.*" The second theme was related to the identification of new partners and building networks, and how AI can be an integrating end-product for ecosystem-building and strategic matchmaking. For example, R1 commented on the impact for both large corporations and SMEs, as he laid out the necessity for "*assessing before doing*" to make sure everyone was supported and aligned. There was an example provided from R5, a startup founder, as well: "*We built a project that would link our unique characteristics of our patented product to unique market opportunities.*" The third theme identified was in analysing data and modelling scenarios, whereby R2 mentions AI's ability to execute "*powerful matching of data across multiple databases to identify the ideal possible interlocutor.*" Lastly, a fourth theme addresses the connection of AI with business tools and processes. In this context, R4 describes how human relations skills can be combined with AI to create pathways into untapped geographic markets. In a similar position, R5 describes a multilayered, geo-data analysis approach using AI to filter and narrow down on viable applications of a digital product.

The second area of investigation - *AI as matchmaker* - aimed at understanding how AI can facilitate coordination and collaboration. Participants showed diverse perspectives of AI's role in enhancing coordination and collaboration. A range of themes demonstrated everything from simplified tools to AI-generated outputs all for coordinating teams. R3 explicitly pointed out the need to simplify the complexity of internal tools, saying, "*We went the reverse route; we chose to use simpler tools all supported by AI, which will assist them in their workflows."* Integration with coordination platforms was recognized across the board. R5 noted, "*For larger teams, AI significantly accelerates coordination, especially when you manage to use something like*

ClickUp," while R2 pointed out that AI-enhanced planning tools and accelerated email prioritization are becoming indispensable. On the communications side, R2 shared some ambivalence about AI automation: "*I still like to do summaries myself… It helps me keep in my own alignment, even if it is more tiring.*" Security concerns were also noted, as R3 recalled a security breach that forced the company to restrict external remote collaboration and spend money on building a new infrastructure. In contrast to these opinions, R6 stated that she had limited experience of AI tools for group collaboration: *"The tools I have used have been more for individual use rather than collaborative team work."* In contrast, R7 provided a specific instance of the use of AI in improving coordination and stated, "*We developed an AI app to help optimize employees and management structure, it allowed for more objective and efficient coordination. It was the AI output which allowed us to improve in these areas*". These contributions indicate that while generative AI's capability to streamline workflows and enhance existing tools is valued, and that it is being explored in a real-time group collaborative nature, the emphasis has been on new processes for generating output and preserving process objectivity.

In the third area of investigation - *AI as forecaster* - the interviewees emphasized five key areas in the domain of utilisation of AI in risk management and successful business management. The first was a strong indication that human supervision is essential, and that each entrepreneur or decision making individual plays invaluable functions. For instance, R1 stated: "*We still have to supervise.... assessing success and risks remains the entrepreneur's responsibility*" while R3: "*There is no way I would completely trust what AI would say, reasoning is still human*". The second cluster was the use for implementation of early warning systems, which provides a similar arrangement over and above normal utilisation. In this case, R2 explained how their system has the ability to flag potentially critical situations for client companies, where AI would be able to detect and utilise for significant labour savings, and reduced reliance on individuals; "*AI can monitor, and work on lesser observed cases and even be automated for success*". The next cluster has relevance from an administrative, and also credit risk domain. But specifically with the mention of R4 utilising AI to assess client solvency - as he pointed out "*I utilise AI to assess clients and their creditworthiness supplier, and to rest easier regarding future insolvency, especially to corner surplus on our potential and have sustainable alternatives towards business decisions*". In the fourth cluster, AI was seen as the process of discovery of underlying and hidden patterns. R5 illustrated how monitoring could be extended to patterns in subtle signals - including SEO trends - to assist someone in pre-empting upcoming risks: "*AI has its place in recognizing patterns that could be expanded to web positioning, to assist in the efforts of those who monitor online environments.*" Finally, the fifth cluster revealed AI in respect of safety and regulatory compliance. R6 articulated AI's relevance in risk modelling in respective products, especially in areas such as toys involving chemical materials. "*AI had the potential to model risk parameters from input by supplier, to the final product itself, and posed a pathway to contextualize safety monitoring.*"

The fourth area of investigation - *AI as cartographer* - aimed at discovering how AI can overcome barriers to data sharing and promote data use. The first main challenge highlighted by participants is data security and confidentiality, as multiple respondents, such as R3 and R6, showed strong hesitance to share internal or sensitive data. For example, R3 indicates that "*the more a system opens up, the more it is vulnerable*," and companies will likely have "*a space of security*" because they are careful and trusting in change. In parallel to that discussion, participants discussed a data-sharing culture, specifically in terms of sharing data in open data, and structured collaboration. R1 emphasized the "*promotion of a data culture*" from the "*networking of companies, public institutions and universities*" to support data openness, while R5 emphasized AI can help "*favour a culture of data use*" mainly through the intelligent use of open data. In addition, AI is also framed as a facilitator to provide richer collaboration and access to actionable insights from less-sensitive data. As R2 stated, "*AI tools can enhance communication, even around risk*", but human interpretation is still needed to extract actionable value. Similarly, R7 noted that AI has made "*raw data more available*", even if companies "*keep the targeted data*

close to home". Finally, participants expressed some concern about a lack of legal clarity and need for human oversight, such as R4 noted, "*AI use is still legally unstable*", particularly in personal data-related scenarios.

R6 reiterated: knowledge can only be shared "*as long as it's involved in researchprojects that are protected by an NDA*", showing the necessity for formal agreements and regulatory protections.

The fifth area of investigation - *AI as conducter* - aimed at understanding how to harmonise ideas while protecting information. Here, participants generally recognised the difficulty of integrating creativity and collaboration with the imperative of safeguarding information. A first principal theme relates to legal and authorial ambiguity, such as R3 declares: "*The notion of authorship is becoming outdated... as soon as you share, you lose part of your intellectual ownership*." R1 states: "*There are no clear laws, and it's difficult to provide a complete answer at this moment*." This uncertainty contributes to what we present as the trust-fear-openness paradox, whereby R3 emphasises the multiplicity of attitudes: "T*here's fear, availability, openness... it is a process that is still evolving*" while R2 also echoes such ambivalences: "*We are already writing for the machines- we're feeding them, and while doing so, we are losing the protection*." Some participants do offer to implement technical and organisational means of safeguard such as R1 states: "*An intelligent system could cover who has access to what, supported by maybe a blockchain for tracing*" while R5 recalls: "*In my company we used NDAs internally to limit access to sensitive data from the e-commerce client*." Private AI and internal workflows are identified as a useful middle ground. R2 notes: "*For those companies who are primarily worried about exposing data, they should work with private AI which is custom-trained on their datasets instead of large public models*." R5 echoes this: "*At least we give ourselves a healthy operational model*." Finally, interviewees highlight the strategic value of proprietary data whereby R2 cautions: "*Company data is frequently sensitive and strategic - we have to protect it with intentionality, knowledge, and compliant tools*." Overall, while the interviews don't reveal any concrete answer, they suggest an environment where manifesting protection and innovation must evolve together as the landscape evolves - bound to evolve with both legal change and technological potential.

The sixth area of investigation - *AI as whistleblower* - focused on how AI can guarantee ethical behaviour and security. The discussion contained several different perspectives about how AI might be a vehicle for ethical practices as well as address the barriers of data-sharing. The first theme spoke to the ethical fragility and social impact of AI, with an uneasiness that AI will also perpetuate and amplify societal biases. As R3 suggests, "*AI learns from our input. If the input is untrue, then the output is more untrue, and possibly amplified*." Concerns manifested over polarisation, R3 warned that "*open environments could just reflect the echo chambers of social media*." The second theme was the desire for structural frameworks and shared protocols. R2 pointed out, "*We became a member of RETIC which helps us define frameworks in this space. However, everything is still a work in progress*." While there was some scepticism as to the probability of effective regulation as with R5 speaking to this point, "*There are no guarantees of ethical behaviour with AI, just as there are no guarantees with the internet*." Another theme was consensus that transparency, and human oversight is of utmost importance. R1 stressed the need to, "*keep everyone in the loop to have a measured human control*." Relatedly, technological pluralism was framed as an opportunity to encourage a diversity of perspectives, and opportunities to help mitigate monopolies, and promote critical thinking. R2 remarked "*Having technologies helps us compare outputs - assuming we're trained and critical enough to do it.*" Education and certification emerged as real ways to incorporate ethics into organisations. R6 spoke about training staff and following communication guidelines, while R7 envisioned "*certifications for AI use like we have for sustainability or gender.*" Finally, some participants had doubts about control. R4 presents this perspective: "*AI is a weapon. It can be used for good or evil; but we can't control anything.*" R7 added, "*There's so many things we can't even monitor anymore.*"

In the seventh area of investigation - *AI as vanguard* - the aim was to understand how AI can be used to identify business opportunities. Participants frequently noted that AI offers excellent opportunities for increasing and reducing business processes, particularly for SMEs involved in open innovation. R2 noted that AI has the ability to "*reduce the burden of repetitive work within companies and help them to concentrate on what is really their core business, in a tailored way,*" indicating that AI offers the ability for companies to redistribute their resources toward more productive endeavours by automating specific repetitive elements of operations. R3 added that AI represents a "*characterising component of collaborative environments between institutions and companies*" and can help "*reduce the difficulty of dealing with large datasets and dealing with organisational processes*," all of which support decision-making is and effort-related outputs within multiple workflows associated with organizational activities and efficiencies. This ultimately reaffirms AI's potential to cultivate collaborative and interdependent virtual innovation ecosystems, where entities leverage shared knowledge to develop improvements in process. R5 focused on customer management noting that AI "*can support the effort that, not too long ago, needed several operators*," pointing to areas associated with customer care and lead management which are paramount areas of business. The adoption of AI-based automated support in such places will not only drive efficiencies, but enhance the customer experience by enabling faster responses and more customized touch points in service delivery. R4 discussed the importance of industry-specific customisation, and he noted that AI can be useful in "*processing lots of information, orienting clients, moment, and merchandising concerns*," to create customised solutions that reflect the individual operational requirements of the various sectors. This particular flexibility and fit of AI makes it a contributing solution in the open innovation context. At the strategic level, R1 commented on the pivotal opportunity that open innovation represents, in "*opening companies up to outside knowledge and experiences*," to support the development of clear innovation road maps for process improvement. This indicates the need to integrate internal competencies with the external technological evolution for optimal benefit.

In the eighth area of investigation - *AI as broker* - participants shared a complex view of AI's role in managing activities and resources with multiple partners. One primary insight was the performance features of AI-driven platforms, including centralised booking or CRM platforms that take in inputs from many sources while reducing a logistical risk of overbooking. As R7 stated, " *It allows you to optimise the data flows and avoid risks that happen all the time, like overbooking.*" Another area emphasised how AI can enable collaboration between multiple partners, also internally and externally, by removing real time data sharing and trust barriers. R1 explained that a developed platform would aid the development of a business network, by inducing "*collaboration and lowering the distrust inherent in entrepreneurial ecosystems.*" Subsequently, it was identified that human- AI interface, and human-led initiative, are important to education and labour. R3 stated that platforms only "*help*," but, "*with a large management effort*," and if there is excessive reliance on AI, "*there's a risk that people stop acting and delegate to the machine.*" In this respect R4 added that AI can "*help processing the data with a lot of partners*," but human capacity to lead is indispensable. Finally, the last cluster highlighted an interest in AI-enabled strategic intelligence and matching primarily in education and labour markets. R5 suggested that "*university databases matched the need required from the company*", and R3 noted that this proactive matching was already being investigated, but both R3 and R5 warned about organisation governance and personal active contribution.

The ninth area of investigation - *AI as custodian* - aims at understanding how AI ensures fair distribution and protects intellectual property. Participants' responses revealed that there is a dominant scepticism about AI's capabilities currently to assure fairness in distribution and to secure IP. Several respondents including R1 and R3 firmly state that it "*won't be able to guarantee it*" and that the regulation "*needs to be regulated somehow sooner or later.*" (R3). R2 acknowledges that we need a legal frame but admits "*There must be a reference regulation... but I don't have enough*

competence on that subject." That said, there is some cautious encouragement from R5 who expresses hope of AI: "*We hope it's intelligent enough to find a way... but it's tough.*" R6 does point to an existing AI case where the technology is actively being used to report oversights into brand misuse online. "*There has to be someone comparing these reports constantly... I can't do it by myself.*" Finally, R7 introduces a different flavour to the conversation by explaining that because their business does not hinge on IP, instead based on experience, they serve as a counterexample of the issue.

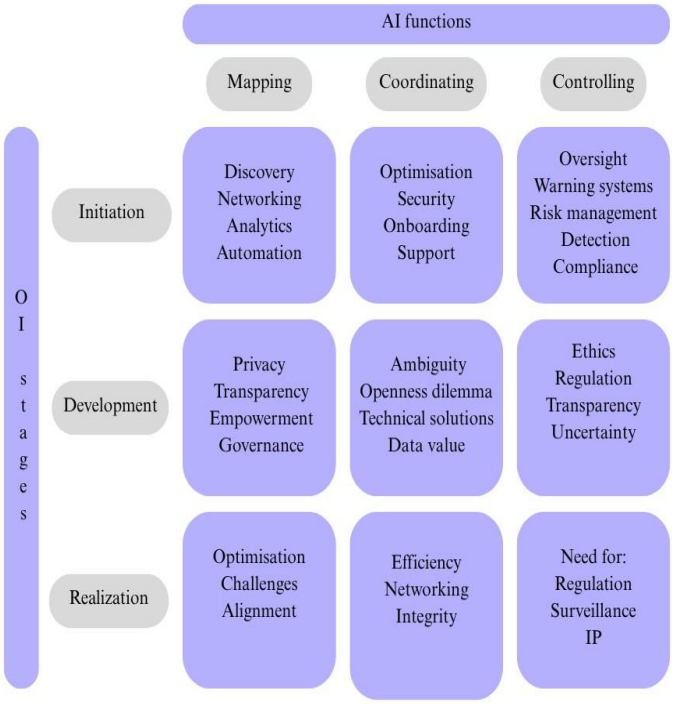

Figure 1: Authors' own elaboration based on Broekhuizen et al. (2023)

5. Discussion

This paper examines a burgeoning theme in innovation studies: the convergence of open innovation and artificial intelligence (AI), with an empirical focus on SMEs in the Region Lazio. Although AI's strategic importance for collaborative innovation is well recognised, qualitative research on how regional actors perceive, adopt, and integrate AI into their open innovation processes remains scarce. Our study fills this gap by exploring the functional roles that practitioners assign to AI across the stages of open innovation, while also mapping key barriers and enabling conditions.

The findings reaffirm AI's growing importance as an enabler within open innovation, strengthening both empirical and theoretical insights from recent literature. Yet, we also reveal considerable heterogeneity in how organizations adopt and interpret AI, resulting in a context-dependent and dynamic landscape. Aligned with Broekhuizen et al. (2023), our focus groups surfaced nine distinct AI functions, demonstrating that AI is regarded not only as an operational tool but also as an object of governance, mediation, oversight, and ethical reflection. In the Lazio context, SMEs experiment with AI at various points in the innovation cycle—particularly in mapping, coordination, and forecasting (AI as "*scout*," "*matchmaker*,"

and "*forecaster*"). Some firms, such as R2 and R7, leverage AI to streamline resource management and monitor patterns and risks, reflecting a tactical, performance-oriented approach, aligning with Kajiura (2012). Others, like R6 and R4, highlight regulatory uncertainties, ambiguities around IP, and the need for human oversight — concerns that align with the rationale behind proactive strategies aiming to balance IP protection with the need to collaborate and innovate (Kajiura, 2012) —casting AI in roles akin to "*whistleblower*." A prominent tension emerged between openness and protection, evidenced by selective use of tools such as NDAs, private AI systems, and blockchain. This underscores that the propensity for open innovation depends not only on technological capabilities but also on cultural and regulatory constraints, echoing the structural and cognitive barriers identified by Burger-Helmchen (2024). Simultaneously, our research shows that AI can bridge otherwise distant organisational spheres—companies, institutions, and academia— through initiatives like RETIC projects and university–industry matching platforms. This aligns with the findings exemplified by Cricchio et al. (2025), showing how open innovation platforms enable firms to balance collaboration and specialisation.

Overall, our results suggest that AI-driven digital transformation is never neutral but is shaped by strategic choices and organisational interpretations that redefine open innovation logics. As such, AI functions as a generative technology - capable of amplifying both the promise and the ambivalence of open innovation - and demands a flexible, reflexive, and multi-level management approach.

6. Conclusion

This study offers an initial qualitative contribution to understanding AI-enhanced open innovation processes in SMEs. It demonstrates that AI adoption is gradual and influenced not only by technical resources but also by cultural, institutional, and relational factors. Interviewed firms fluctuate between openness and caution, enthusiasm and scepticism. To achieve systemic impact, coordination between public and private actors will be essential to develop shared skills, regulations, and infrastructure. In this scenario, AI functions not as a substitute but as an amplifier of collective intelligence within regional ecosystems.

Theoretically, this work enriches our understanding of the AI–open innovation intersection by revealing that AI's roles extend beyond technical functions to include symbolic, regulatory, and ethical dimensions. New tensions emerge - between openness and control, and between automation and human agency - that warrant further theoretical exploration. From a managerial perspective, the implications are clear: SMEs should pursue incremental AI strategies, emphasizing small-scale experimentation, in-house training, and the development of shared platforms with other ecosystem stakeholders. Simultaneously, regional institutions can build trust and promote interoperability among systems and actors.

The main limitation lies in the sample's size and scope: although it ensured sectoral and organisational diversity, the empirical base remains small (n = 7) and confined to a single geographic area. Moreover, the qualitative focus group methodology enables rich phenomenological insights but does not support broad generalisation.

Future research could expand to other regions and integrate quantitative (surveys, network analysis) and longitudinal methods to track AI adoption over time in open innovation processes. Additionally, examining the role of intermediaries - such as universities, incubators, and public bodies - in facilitating SMEs' transition to AI-based collaborative models would be valuable. Finally, given widespread concerns about regulatory uncertainty and reputational risk, the ethical and legal dimensions of AI adoption deserve dedicated study.

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