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REPORT ON THE NON-PLATFORM-BASED INNOVATION ECOSYSTEMS AND BUSINESS MODELS

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ABSTRACT

Innovation ecosystems are often conceptualized as platform organizations. Still, many innovation ecosystems lack platforms and use organizational mechanisms for ecosystem alignment. We have studied these mechanisms as described in theory, and also empirically in EINST4INE industry partners The Linux Foundation and Plug and Play Tech Center (Arena2036). We have also included a comparative sociosymbolic analysis of these organizations with similar entities i.e., Y Combinator and Techstars. We found that non-platform-based business models facilitate collaboration in innovation ecosystems through creating a social space and enabling flows of economic, cultural, social, and symbolic capital. These innovation intermediaries increasingly leverage ecosystem infrastructure to create as-a-service business models. We hence define an innovation intermediary as an entity that facilitates the collaboration process, i.e. search and exchange of knowledge, ideas, and resources, and builds infrastructure between individuals and organizations to accelerate the innovation processes. We can then define an ecosystem builder as an innovation intermediary that focuses on creating ecosystem infrastructure.



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1. ELEMENTS OF NON-PLATFORM-BASED INNOVATION ECOSYSTEMS

1.1 INNOVATION ECOSYSTEMS

The ecosystem concept has emerged as a popular topic among management scholars in strategy, innovation, entrepreneurship, and marketing and is gaining increased attention in practice and policy (Adner, 2017; Daymond et al., 2023; Jacobides et al., 2024). Digitalization is a major force driving ecosystems (Thomas and Autio, 2020; Dąbrowska et al., 2022) and gives rise to generativity and digital affordances (Autio et al., 2018). Emerging technologies necessitate the development of new technological capabilities and coordination across diverse players across industries and form new ecosystems. There are several types of ecosystems and significant overlaps among them. Each offers a different perspective based on a distinct theoretical background as summarized in table 1.

Theoretical background	Strategy and Innovation	Economics	Entrepreneurship	Marketing
Ecosystem type	Innovation ecosystems	Entrepreneurial ecosystems	Entrepreneurial ecosystems	Service ecosystems
Ecosystem definition	<i>"a network of interconnected organizations, connected to a focal firm or a platform, that incorporates both production and use side participants and creates and appropriates new value through innovation"</i> (Thomas & Autio, 2020)	<i>"set of interdependent actors and factors coordinated in such a way that they enable productive entrepreneurship within a particular territory"</i> (Stam & Spigel 2017)	<i>"entrepreneurial ecosystems as a digital economy phenomenon that harnesses technological affordances to facilitate entrepreneurial opportunity pursuit by new ventures through radical business model innovation"</i> (Autio et al., 2018)	<i>"A service ecosystem is a relatively self-contained, self-adjusting system of resource-integrating actors connected by shared institutional arrangements and mutual value creation through service exchange"</i> (Vargo & Lusch, 2015)
Ecosystem perspective	Production system	Regional development construct	Scale ups of new business models	Consumption system
Dominant theories to study emergence	Evolutionary economics, institutional theory, collective action	Institutional theory, complexity science, systems theory, evolutionary economics	Social movement theory, collective action	Social emergence, Institutional theory, complexity science
Dominant emergence driver	Technology	Region	Firms and interactions	Interactions

Table 1. Ecosystem types



Scholars in strategy, innovation, information systems technology, service marketing, entrepreneurship, and regional development have emphasized ecosystems' emergence, development, and evolution. However, each focuses differently; for strategy, the focus is firm and its ecosystem (Daymond et al., 2023), while marketing focuses on how value emerges from the user perspective (Vargo and Lusch, 2015). There are two distinct schools of thought within entrepreneurial ecosystems. One comes from economics and regional development, where the focus is on productive entrepreneurship (Stam and Spigel 2017). Here, agglomeration economics are central and ecosystems are treated as a whole with external mechanisms fomenting ecosystem emergence. The other school of thought in entrepreneurial ecosystems comes from strategy and innovation (Autio et al., 2018). Although there are differences regarding focus and level of analysis, the major force driving the emergence is digitalization and emerging technologies. Technology is a major driver for ecosystem emergence, particularly in innovation ecosystems (Dattée et al., 2018).

1.2 NON-PLATFORM-BASED INNOVATION ECOSYSTEMS

Technology development is hence increasingly situated in innovation ecosystems (Nylund and Brem, 2023; Ritala, 2024). Some of these innovation ecosystems are coordinated by centralized platform structures or digital infrastructures (Gawer and Cusumano, 2014, Cennamo et al, 2023). Yet many are non-platform-based ecosystems that use other coordination mechanisms (Kretschmer et al., 2022; Jacobides et al., 2024; Baldwin, 2024, Ch. 3: Baldwin et al., 2024). Firms can align organically around a value proposition and form an ecosystem (Adner, 2017). One of the organizations of the ecosystem can also take the role of an ecosystem orchestrator (Ritala et al., 2024). However, often an innovation intermediary is necessary to generate and optimize knowledge flows.

Innovation intermediaries are organizations that facilitate collaboration between multiple parties during various stages of the innovation process (Howells, 2006). They play an important role in designing complex ecosystems for modern innovation processes (Randhwa et al., 2022). They are also referred to as brokers, third parties, agencies, knowledge brokers, system builders, middle actors, and strategic intermediaries (Howells, 2006). However, the role of innovation intermediaries has evolved, and what was called an intermediary a decade ago is radically different from the role they have today.



Several changes help to understand this transition. The locus of innovation has shifted from producer innovation to user and open and collaborative innovation (Bakici et al., 2013; Randhawa et al., 2017). In this context, with increasing need for collaboration skills to access breakthrough technologies and entrepreneurial mindsets, innovation intermediaries have arisen. Corporates need to rapidly source knowledge and achieve organizational learning (Levitt and March, 1988). They therefore look to startups and entrepreneurs for solutions and become part of the entrepreneurial ecosystem. This has implications for both corporate innovation ecosystems and corporate entrepreneurship (Stopford and Baden-Fuller, 1994). Besides corporate-level effects, this also has implications for the governments at the national and regional levels. Therefore, large incentive schemes and regulatory mechanisms are put into place to support these innovation ecosystems (Cozzolino and Geiger, 2024), with the expectation to see effects in the pace and scale of technological innovations. However, the question remains, who orchestrates such broader and accelerated innovation dynamics?

Innovation intermediaries have now reached a status wherein they are playing a very crucial role in innovation ecosystems, and sometimes they are also able to create, build, support, initiate, or foster innovation ecosystems. They can hence organize multiple parties together around a value proposition (Iansiti and Levien, 2004; Adner, 2017). As innovation ecosystems burgeon on a global scale, it becomes critical to comprehend the structures, processes, and mechanisms behind their emergence (Daymond et al., 2023; Nylund et al., 2019). While scholars have predominantly focused on the ecosystem nodes and relationships within these ecosystems in terms of value flows that are primarily of economic nature, this report emphasizes the crucial role of innovation intermediaries for non-platform innovation ecosystems. These organizations foster connections within innovation ecosystems on a global scale, facilitating the circulation and exchange of various forms of capital. As our social space grows and increasingly globalized and interconnected, understanding the contributions of these intermediaries is of paramount importance.

Hence, this report seeks to explore the non-platform-based dynamics of innovation ecosystems. We draw on Bourdieu's (1986) ideas of capitals from sociology and introduce these concepts to the innovation ecosystem literature, leading to the concept of ecosystem infrastructure. It refers to the underlying socio-technical arrangements facilitating the mobilization and exchange of different forms of capital within an innovation ecosystem. The reasoning behind socio-technical systems is that there is a relationship between technology (mostly machines) and humans. Therefore, the idea of socio-technical systems was fostered to highlight the interdependencies



and relationships of working conditions in industry (Ropohl, 1999). In recent years, the idea of socio-technical systems has seen a revival. Frank Geels mainly drove this development with his idea of socio-technical transitions and innovation systems (Geels, 2005). At its core, he argues for socio-technical landscapes as an exogenous context with socio-technical regimes and niche innovations. In his multi-level perspective, there are actors and rules which prevent radical innovations developing out of niches (Schot and Geels, 2008). In this context, Matschoss and Heiskanen (2018) argue that intermediaries bring changes in the roles and relations, which are key for innovation success and its related innovation ecosystems.

1.3 INNOVATION INTERMEDIARIES

Innovation intermediaries generate interactions in non-platform-based innovation ecosystems and may have various underlying objectives, such as sustainable transitions, assisting in digital transformation etc. (Caloffi et al., 2023; Rossi et al., 2022). Intermediaries are also known as knowledge brokers, third parties, agencies, system builders, middle actors, and strategic intermediaries (Kivimaa et al., 2019). They include knowledge and technology transfer organizations, incubators and accelerators, science parks, publicly funded regional economic development agencies, KIBS firms, professional associations, or consultants (Caloffi et al., 2023). Their principal activities include providing information about potential collaborators, mediating deals, acting as a mediator or go-between for groups or organizations, and assisting in finding direction, funding, and support for innovation outcomes (Abbate et al, 2013).

The role of technology has become more and more important in the last 20 years. Organizations are also increasingly facing disruptive technologies (Christensen, 1997; Blomsma, 2023). Hence, the concept of speed has become crucial for technological change. Firms require innovation to be both fast and cost effective. Thus, there are two major themes for innovation today. Firstly, firms have to respond to disruptive technologies. Secondly, the rapid adoption of open innovation practices and intermediaries in accelerating the innovation process (Bakici et al., 2013; Randhawa et al., 2017). Therefore, the main role of innovation intermediaries is no longer supporting the innovation process as per the definition of Abbate et al. (2013), but accelerating it. Hence, we propose a revised definition of innovation intermediaries as follows.



Definition of innovation intermediary

An innovation intermediary is an entity that facilitates the collaboration process, i.e. search and exchange of knowledge, ideas, and resources, and builds infrastructure between individuals and organizations to accelerate the innovation processes.

Text box 1. Definition of innovation intermediary

The collaboration process itself could also be broadened to include search, exchange of knowledge, and exchange of resources. However, it could also be the aspect of building of the infrastructure for these collaboration mechanisms, which has not been previously considered in the literature. Therefore, we have included these changes to the definition to expand this collaboration process perspective, and also highlighting the view that for this collaboration to happen, we need somebody who build the infrastructure for these collaborations, i.e. an ecosystem infrastructure (Autio et al., 2018).

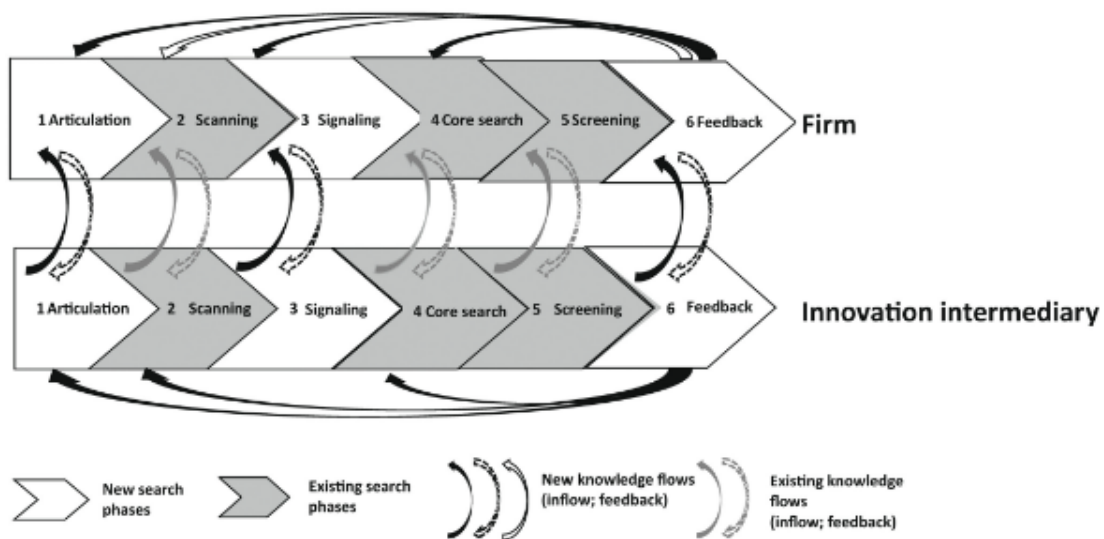
Ecosystem infrastructure comprises both tangible and intangible elements that collectively enable and shape the activities of various stakeholders, such as entrepreneurs, startups, venture capitalists, corporates, and governments (Ritala et al., 2013). The tangible elements include physical resources, technological platforms, and regulatory frameworks, while the intangible elements comprise shared norms, symbolic values, social networks, and cultural practices. While much of the academic focus has been on the technical aspects of the ecosystem, especially within platform ecosystems and strategy literature, this report extends to the socio-structural aspect i.e., the structure of the social space necessary for fostering an innovation ecosystem.



2. NON-PLATFORM-BASED BUSINESS MODELS

The concept of innovation intermediaries builds on accelerators, incubators, venture capital firms, etc. (Caloffi et al., 2023). Such business models were first launched in the Silicon Valley, and have then been exported over the world. In the realm of non-platform-based ecosystems, there is also a rise of as-a-service business models (Ferràs-Hernández et al., 2023). In entrepreneurship and innovation, that means open innovation as-a-service (Mention et al., 2018), as well as entrepreneur as-a-service, or entrepreneurship as-a-service, or startup as-a-service. And all of these new business models are again, driven by changes in the environment and changes in the innovation methods and processes over the last 20 years. Howells and Thomas (2022) have highlighted the phases of innovation search in the role of intermediaries (Figure 1).

Figure 1. The phases of innovation search and the role of intermediaries



Source: Howells and Thomas, 2022

This brings to perspective that now we see the changes in the innovation search process, and a feedback loop or circular route between the firms and innovation intermediaries. Therefore, it's very hard to distinguish, what the firm does and what the intermediary does. There are also differences in clockspeed, where large firms lag behind and have a hard time keeping up with

technological developments (Nylund et al., 2022). To overcome organizational hurdles, increase speed, efficiency, and decrease costs managers then look to the innovation-as-a-service business models. The new innovation intermediaries provide these services. Then the reason for the emergence of these new innovation intermediaries is primarily to fill these needs, and also creating the infrastructure for more collaborative and coordinated approaches to innovation. In table 2, we present an overview of the motivations for the emergence of innovation intermediaries. Increasing complexity of innovation adds to access to funding issues, which add to globalization. All of this is further accelerated by the digital transformation (Dąbrowska et al., 2022).

Challenge	Response from innovation intermediaries
Increasing complexity of innovation	Provide a platform for collaboration and coordination among stakeholders, streamlining the innovation process and accelerating time to market.
Access to funding	Bridge the gap by providing access to funding, mentorship, and other resources that support the development of new ventures.
Globalization	Connect entrepreneurs and innovators across different geographies, fostering collaboration and knowledge exchange.
Digital technologies	Leverage digitalization to create more efficient and effective innovation ecosystems.

Table 2. Motivations for the emergence of innovation intermediaries

2.1 CAPITAL FLOWS IN INNOVATION ECOSYSTEMS

The ecosystem infrastructure regulates and enables the flow of economic, cultural, social, and symbolic capital, influencing the actions, interactions, and outcomes of the ecosystem. This perspective underscores the interdependence of different forms of capital and highlights the role of ecosystemic business models in fostering innovation and entrepreneurship on a global scale.

Drawing from Pierre Bourdieu (1986) this report highlights four types of capital flows in innovation ecosystems: economic, cultural, social, and symbolic, which circulate within this social space, shaping the interactions and outcomes of the innovation ecosystem. Bourdieu's concepts of fields, capitals, and habitus has been used to study power dynamics in digital



platforms and their influence on organized immaturity (Harracá et al., 2023). Our focus extends this reasoning to innovation intermediaries and non-platform-based ecosystems. This approach enables a comprehensive understanding of *how different types of capital are interrelated, how they manifest in the activities of global innovation intermediaries, and how these intermediaries shape the global innovation ecosystem*. Bourdieu identified several forms of 'capital', which individuals or entities can accumulate and which determine their position in the social space.

Bourdieu sees social space as a multi-dimensional structure of the social world, defined by power relationships. In this view, social space is organized around two primary axes; the amount of capital someone possesses and the structure of the capital. The innovation ecosystem can then be viewed as a system of interconnected nodes, where each node represents an actor (an individual, a company, a university, etc.), and the 'pipes' connecting these nodes represent the flow of different types of capital.

Economic Capital: Financial investments flowing between actors. For example, investments from venture capitalists to start-ups, etc.

Cultural Capital: Exchange of knowledge, skills, and expertise. For instance, the knowledge flows from universities to start-ups or the industry expertise that an experienced entrepreneur brings to a new venture.

Social Capital: Establishment of partnerships, collaborations, or networks. For example, the network of start-ups created by an accelerator program, or partnerships between established companies and start-ups.

Symbolic Capital: Prestige or recognition that flows between actors. For example, the legitimacy a start-up gains from being accepted into a prestigious accelerator, or the reputation a venture capitalist builds by investing in successful start-ups.



3. CASE EXAMPLES

To understand the development of non-platform-based business models, we compare four such models, i.e., Y Combinator, Techstars, Plug and Play, and Linux Foundation¹. All are based out of Silicon Valley and the top of their game, when it comes to building entrepreneurial capabilities or building entrepreneurial mindset, having access to funds having access to networking and mentorship opportunities, etc. They also have evolved their business models rapidly over the last decade.

All four engage in incubation programs, accelerator programs, investment funds, mentorship and networking, hackathons, and demo days. The corporates look to intermediaries to identify potential entrepreneurs and unicorns. That is why intermediaries have gained a lot of attention in the overall innovation ecosystem. For example, TechStars recently started having a corporate partner on board, and then they also map the startup with the corporates. There is an evolution in this business model as well, because this corporate startup collaboration business model was very successful a few years ago, but now there are hundreds of entities providing similar matchmaking services. In addition, there are a lot of databases wherein firms can scout for startups. Therefore, intermediaries are also now learning and trying to evolve further based on their capabilities (Table 3).

¹ General profiles of the innovation intermediaries are available at their websites www.ycombinator.com (Y Combinator), www.techstars.com (Techstars), www.plugandplaytechcenter.com (Plug and Play), and www.linuxfoundation.org (Linux Foundation).



Intermediary	Focus Area	Prioritized Capabilities
Y Combinator	Entrepreneurs, Venture Capitalists	Innovative thinking, Technical skills, Business acumen, Product development, Pitching and fundraising
Techstars	Entrepreneurs, Venture Capitalists, Corporations	Strategic thinking, Technical skills, Networking abilities, Business development, Leadership
Plug and Play	Entrepreneurs, Corporations, Investors	Innovation skills, Collaboration, Technical skills, Industry-specific knowledge, Networking abilities
Linux Foundation	Developers, Corporations, Governments	Technical skills in open-source software, Collaboration and teamwork, Problem-solving, Communication skills, Leadership in open-source projects

Table 3. Overview of the studied innovation intermediaries



To understand the impact on the innovation ecosystems of each intermediary, we compared the capitals and interactions in order to develop a socio-symbolic framework (Table 4).

Intermediary	Economic capital	Cultural capital	Social capital	Symbolic capital
Y Combinator	Provides initial funding to startups and the potential for further investment during the demo day	Offers education, mentorship, and fosters an entrepreneurial culture of innovation	Facilitates connections to a network of successful entrepreneurs and investors	By being accepted into Y Combinator, startups gain significant reputation and prestige in the tech world
Techstars	Provides funding and opportunity for further investment	Offers an entrepreneurial education and a collaborative culture	Connects startups with mentors, alumni, and investors	The reputation associated with being Techstars.
Plug and Play	Provides seed funding and potential access to further investment.	Facilitates learning and access to a broad range of industries	Connects startups with corporations, investors, and mentors	The prestige associated with being part of a global innovation platform
Linux Foundation	Indirectly helps projects secure funding through credibility	Promotes a culture of collaboration and shared knowledge	Offers access to a global network of developers and industry leaders	The recognition and prestige associated with being under the Linux Foundation umbrella

Table 4. A socio-symbolic framework of innovation intermediaries



The order of importance of these forms of capital can vary based on the specific needs of the startups or projects involved. However, it's the interplay and mutual reinforcement of these capitals that make these organizations valuable for startups and contribute to their innovation ecosystems. These intermediaries convert their symbolic capital into other forms of capital, leveraging their reputations and symbolic identities to attract resources, opportunities, and talent.

3.1 THE CASE OF Y COMBINATOR

With Y Combinator, startups gain economic capital through funding, social capital through the networking opportunities, and symbolic capital through the association with Y Combinator, all of which feed back into enhancing the cultural capital. The importance of each capital depends on the startup's stage and needs, but symbolic capital might be seen as particularly crucial due to the reputation boost it offers. Y Combinator's brand is associated with entrepreneurship, innovation, and success. The "YC" logo and alumni network serve as symbols of quality, indicating that a startup has been verified by a prestigious organization. This symbolic capital can enhance a startup's economic capital by attracting investment, human capital by attracting talented individuals, and social capital by granting access to a prestigious network. Through its selection of startups and focus areas, YC can influence trends and directions in the global startup ecosystem.

3.2 THE CASE OF TECHSTARS

Techstars aims to balance the provision different capitals, fostering a symbiotic relationship where the cultural and social capital can lead to increased economic and symbolic capital. Techstars is known for its strong mentorship and community, symbolized by their marketing. This symbolic capital can strengthen social capital by fostering strong networks and relationships. It can also attract economic capital (investment) and human capital (talented individuals who value the mentorship and community). By choosing which startups to support and where to open new programs, Techstars can influence regional and sectoral innovation ecosystems.



3.3 THE CASE OF PLUG AND PLAY

Plug and Play offers an environment where economic, social, and symbolic capital mutually reinforce each other. The social and cultural capital are pivotal in Plug and Play, facilitating connections to potential customers and partners. Plug and Play's identity as an innovation platform and global accelerator symbolizes connections between startups and larger corporations. This symbolic capital can enhance a startup's social capital through networking opportunities and economic capital through potential corporate partnerships and investment. By choosing which startups to support and which industry verticals to focus on, Plug and Play can shape the dynamics of the innovation ecosystem.

3.4 THE CASE OF LINUX FOUNDATION

The Linux Foundation heavily emphasizes social and cultural capital, which in turn bolster symbolic and economic capital. The symbolic capital gained by association with the Linux Foundation can be a significant factor for open-source projects. The Linux open-source ethos symbolize collaboration, community in software development. This symbolic capital can enhance social capital by attracting a community of like-minded developers. It also indirectly contributes to human capital by fostering a space where developers can learn from each other and improve their skills. By deciding which projects to host and support, the Linux Foundation can shape the direction of the open-source software ecosystem.



4. THE ECOSYSTEM-BUILDING BUSINESS MODEL

New business models play a vital role in bringing open innovation processes to the ecosystem level (Dąbrowska et al., 2019; de Vasconcelos Gomes et al., 2023). Two notable examples are The Linux Foundation, an open technology ecosystem, and Plug and Play Tech Center, an open innovation ecosystem. Both organizations emphasize the importance of "openness" and "marketing" to attract ecosystem participants and generate momentum for innovation and technology development. It is also important to note why both openness and marketing emerged as socio-cultural needs to be fulfilled.

The Linux Foundation was started as a nonprofit organization, supporting the development of open-source software, including the Linux operating system. Now, it is increasingly building an ecosystem through matchmaking between corporates and Linux developers. Talent acquisition is a big question mark for large firms, and the Linux Foundation is ideally situated to bridge this gap. It also provides a wider range of services, including technical support, training, certification, and legal services. It thus serves as a neutral, independent intermediary between various stakeholders in the open-source ecosystem such as developers, users, vendors, and other organizations. The Linux Foundation hence provides a platform for collaboration and coordination, which helps to foster innovation and drive the adoption of open-source technologies. It operates a number of industry initiatives and collaborative projects focused on areas such as cloud computing, blockchain, and networking, which helps to drive innovation and advance the state of the art in these fields. The Linux Foundation acts as a mediator between the corporates who are looking for open-source solutions. They have also created the Hyper Ledger Foundation which is successful in the blockchain ecosystem, and it's very well monetized.

Plug and Play can be conceived as a knowledge bridge from Silicon Valley to other ecosystems primarily through bringing the Silicon Valley technology, startups and entrepreneurial culture. Over time, the role of Plug and Play has transformed from simply matching startups with corporates to actively shaping the larger innovation ecosystem and facilitating the emergence and evolution of the ecosystem. The new model encourages collaboration among various ecosystem entities such as corporations, governments, academia, research institutions, universities, venture capitalists (VCs), corporate venture capitalists (CVCs), non-governmental



organizations (NGOs), non-profit institutions, accelerator programs, and entrepreneurial support organizations (ESOs). Plug and Play, leveraging its ecosystem, provides open innovation services as well as leveraging its venture capital background to help corporates build CVC units and explore new opportunities for innovation. One significant change in the role of Plug and Play has been its expansion into larger and more diverse ecosystems. This expansion allows Plug and Play to offer its services to a wider range of players in the industry and promote collaborations among them. By bringing together startups, corporates, academia, research institutes, and other organizations, Plug and Play is able to support innovation and foster an entrepreneurial culture in the ecosystem, including that of collaborating and sharing information.

4.1 EVOLUTION OF NON-PLATFORM BUSINESS MODELS

The Linux Foundation and Plug and Play Tech Center engage in extensive marketing activities to create a buzz around openness in technology and innovation development. While this may seem counterintuitive, these business models serve an essential socio-cultural need (Elenkov and Manev, 2005) for organizations to appear innovative and attract potential employees, organizations, and ecosystem participants interested in innovation-driven environments. These intermediaries not only contribute to innovation and development but also enhance the perceived innovation capabilities (Randhawa et.al, 2022) of the companies they work with. Examples can be observed in the benefits they offer members and the events they host, such as Linux Foundation Summits and Plug and Play Expos, along with various other networking opportunities and actual "how-to" guides for their ecosystem participants to promote themselves on social media, including LinkedIn posts/videos/live webinars and YouTube videos and webinars. Both intermediaries attract ecosystem participants and create value through ecosystem building while capturing value by gaining insights from the ecosystem.

Randhawa et al. (2017) point out that Open Innovation intermediaries use three boundary management mechanisms: syntactic, semantic, and pragmatic to facilitate knowledge transfer, translation, and transformation between client organizations and online user communities. However, they don't highlight the increased importance of OI intermediary in building, harmonizing and orchestrating the ecosystem and how it captures value by building these infrastructural knowledge bridges.

The sheer scale of the intermediary allows it to make the ecosystem more attractive. Since they are in the centre of the ecosystem, they have more knowledge, which leads to power (Powell et al., 1996). The Linux Foundation, as a non-profit organization, primarily serves the needs of its corporate partners. In contrast, Plug and Play Tech Center, as a venture capital firm, leverages



its relationships with corporate partners to conduct due diligence with startups, unlocking the potential for better investments. Venture capital business is not easy, and having better access initially to validate startups' ideas through more rigorous due diligence by experts in corporations improves the chances of making fruitful bets for the venture capital business.

The Linux Foundation and Plug and Play Tech Center exemplify the crucial role of ecosystem builders in fostering innovation and technology development. By promoting openness and engaging in marketing activities, they attract ecosystem participants and create value for both the organizations and the broader ecosystem. These intermediaries satisfy the socio-cultural need for companies to be and appear innovative while simultaneously benefiting from the value generated within the ecosystem. Table 5 summarizes how intermediaries operationalize these mechanisms with factors especially relevant for the emergence and evolution of the ecosystem. The table provides a comparative summary of the Linux Foundation and Plug and Play Tech Centre, showcasing their purposes, needs fulfilled, evolutions, implementations, and value creation and capture.



Aspect	The Linux Foundation	Plug and Play Tech Center
Purpose	Developing “open technology” ecosystems by bringing together companies and individual contributors	Developing an “open innovation” ecosystem by connecting startups, corporations, and investors to accelerate innovation and technology development.
Needs Fulfilled	Providing a neutral, trusted hub for collaboration on open-source projects and scaling efforts; fostering innovation, accelerating development, lowering costs.	Providing a platform for collaboration, fostering innovation, accelerating technology development, connecting startups with potential partners and investors, enabling corporations to access innovative solutions and technologies.
Evolution	The increasing demand for open-source technologies and the need to foster a collaborative ecosystem.	The growing need for collaboration and co-innovation between startups, corporations, and investors to address complex business challenges and stay competitive in the rapidly evolving technological landscape.
Implementation – Corporate Partners	Offering access to marketing, research, training, and event opportunities; enabling alignment with best practices, networking with industry peers, and assistance in recruitment efforts.	Offering access to a curated selection of startups, providing networking opportunities, hosting innovation events and workshops, and facilitating collaboration on pilot projects and investment opportunities.
Implementation – Startups/Individuals	Providing mentorship programs and resources for talent development, networking, and giving back to the community.	Providing startups with access to a vast network of corporate partners, investors, and mentors; offering resources such as office space, funding opportunities, and targeted acceleration programs to support growth and development.
Value Creation and Capture	Creating and capturing value through ecosystem development efforts, driving innovation, transforming industries, shaping markets, and lowering costs, benefiting all stakeholders involved.	Building a collaborative ecosystem that connects startups, corporations, and investors, driving innovation and technology development; facilitating partnerships and investment opportunities, enabling corporations to access cutting-edge solutions and startups to scale their businesses.

Table 5. The evolution of innovation intermediaries in the context of socio-cultural needs



Both intermediaries are similar in the socio-cultural context in a way that they are fulfilling the needs of the corporates to be more innovative. At least, both of them, with their intense networking and strategic marketing efforts, are helping firms look innovative, engaging in perception and impression management to attract the individual contributors and startups etc.

Orchestration, rooted in the concept of a musical orchestra, involves coordinating and managing the ecosystem to achieve specific goals or value propositions (Dhanaraj and Parkhe, 2006). It may have temporal aspects, such as emergence, development, maturity, and decline phases (Nambisan and Sawhney, 2011). However, it does not primarily focus on laying the foundation, infrastructure for the ecosystem to exist in the first place (cf. Autio, 2022).

4.2 TOWARDS ECOSYSTEM-BUILDING

Ecosystem building has been defined as creating and developing the networks, relationships, and infrastructure that make up the ecosystem (Zahra and Nambisan, 2011; Kuebart, 2022). It has a bottom-up connotation, laying the foundation for an ecosystem to exist in the first place. The Linux Foundation, for example, has laid the foundations for an ecosystem to exist by building and developing the infrastructure (open source) on which the ecosystem can function and work among multiple stakeholders. Plug and Play has built the infrastructure in form of globally connected stakeholders and ensuring mutual benefits for complementary stakeholders e.g. corporations, startups and investors. We thus define the ecosystem builder as follows:

Definition of ecosystem builder

An ecosystem builder is an innovation intermediary that focuses on creating and developing the networks, relationships, and infrastructure that make up the ecosystem.

Text box 2. Definition of ecosystem builder (Authors' own elaboration)



5. CONCLUSIONS FOR NON-PLATFORM-BASED INNOVATION ECOSYSTEMS AND BUSINESS MODELS

In conclusion, non-platform-based ecosystems can be purposefully coordinated by business models that facilitate collaboration. Understanding innovation through a sociosymbolic and socio-technical perspective has enabled us to identify the key role of the socio-structural aspect in the emergence of innovation ecosystems. Ecosystem-building innovation intermediaries focus on generating collaboration infrastructures and provide as-a-service business models e.g. open innovation as-a-service, entrepreneurship as-a-service or startup as-a-service. The key takeaways from this report are hence summarized in the text box below.

Key takeaways

- Non-platform-based business models facilitate collaboration in innovation ecosystems, i.e. search and exchange of knowledge, ideas, and resources, and builds collaboration infrastructure.
- New business models create the social space required in innovation ecosystems and enable flows of economic, cultural, social, and symbolic capital. Symbolic capital boosts other forms of capital.
- Intermediaries increasingly leverage ecosystem infrastructure to create as-a-service business models.
- An ecosystem builder is an innovation intermediary that focuses on creating ecosystem infrastructure.

Text box 3. Key takeaways on non-platform-based innovation ecosystems and business models

Thus, for an ecosystem to be built, created, or formed, there is a need for ecosystem infrastructure. In our current understanding of ecosystems, this infrastructure is typically thought



of as a technology platform around which the ecosystem forms, such as Google, iOS, Android, Amazon, Uber, or Airbnb (Gawer and Cusumano, 2014.) This is because of the bias resulting from the success of these disruptive digital giants from the US. However, when this disruption reaches global shores, specifically the EU (which is a laggard in innovation, in a disruptive sense) and Eastern markets (where the dynamics are different), we see the rise of global ecosystem builders and other non-platform-based business models. This reflects a growing need for innovation capabilities and decreasing spatial transaction costs (Mudambi, 2018). Thus, for incumbent organizations, they need to have the skills, resources, and know-how to build these disruptive businesses or save themselves from disruption through massive transformation and adaptation to the digital shocks affecting all industries (Dąbrowska et al., 2022).



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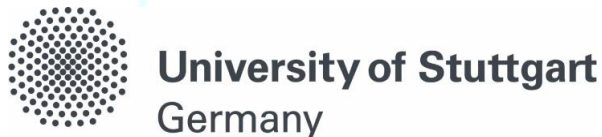


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