Datification of the wisdom of the crowd:
a comparative analysis of innovation strategies in four European crowdfunding platforms

Datificação da sabedoria da multidão:
uma análise comparativa das estratégias de inovação em quatro plataformas europeias de crowdfunding

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Abstract

Crowdfunding is a business model where diverse stakeholders operate in a context considered an example of innovation in value co-creation. Based on literature about service ecosystems and value co-creation this study adopts the platformization of society as critical theoretical approach and analytical framework to study the relations between human and technological agents within four crowdfunding ecosystems in Europe. Conceiving Crowdfunding Service Providers (CSPs) as specialized organizations, regulated to operate multi-sided markets and to serve roles as ecosystems' coordinators, we aim to identify the innovation strategies adopted by CSPs platforms from Italy, France, Spain and Portugal to support their core functions related to governance mechanisms, business models and infrastructural components. To understand the motives for innovation implementation and to compare the competitive adaptation from an ecosystemic perspective, we triangulate qualitative data from multiple sources to explain how and why these strategic choices affect the dynamics of value co-creation. The multiple cases-study systematizes and discusses similarities and differences, particularly as concerns the capacity of CFPs to orchestrate their governance and ICT components to innovate and take advantage of algorithms and AI implementation, collecting more data and money from user interactions. Conclusions highlight the non-neutrality of CSPs, which act as data analysts and translators, adopting more *preventive*, *proactive* or *reactive* strategies of usage and redistribution of the value, created, acquired and aggregated through data. Each CSP can be characterized by its infrastructure and data management approach, metaphorically being more *eco-centred* or *ego-centred*.

Keywords: Crowdfunding, European platforms, innovation strategies, datification.

Resumo

O crowdfunding consiste num modelo de negócios onde diversos intervenientes operam num contexto considerado um exemplo de inovação na co-criação de valor. Com base na literatura sobre ecossistemas de serviço e co-criação de valor, este estudo adota a plataformização da sociedade como abordagem teórica crítica e estrutura analítica para estudar as relações entre agentes humanos e tecnológicos dentro de quatro ecossistemas de crowdfunding na Europa. Concebendo os Prestadores de Serviços de Crowdfunding (CSPs) como organizações especializadas, regulamentadas para operar em mercados de múltiplos lados e desempenhar papéis como coordenadores de ecossistemas, pretendemos identificar as estratégias de inovação adotadas pelas plataformas de CSPs de Itália, França, Espanha e Portugal para apoiar suas funções principais relacionadas com mecanismos de governança, modelos de negócios e componentes infraestruturais. Para entender os motivos da implementação de inovações e comparar a adaptação competitiva de uma perspetiva ecossistémica, triangulamos dados qualitativos de múltiplas

fontes para explicar como e por que essas escolhas estratégicas afetam a dinâmica da co-criação de valor. O sistema de estudo de casos múltiplos sistematiza e discute semelhanças e diferenças, particularmente no que diz respeito à capacidade dos Prestadores de Serviços de Crowdfunding (CSPs) de orquestrar suas componentes de governança e TIC para inovar e tirar proveito da implementação de algoritmos e IA, coligindo mais dados e extraindo mais valor monetário a partir de interações dos utilizadores. As conclusões destacam a não-neutralidade dos CSPs, que atuam como analistas e tradutores de dados, adotando estratégias mais preventivas, proativas ou reativas de uso e redistribuição do valor, criado, adquirido e agregado através de dados. Cada CSP pode ser caracterizado pela sua abordagem à infraestrutura e gestão de dados, e metaforicamente interpretado como mais centrado no *eco-sistema* ou centrado no *ego-sistema*.

Palavras-chave: Crowdfunding, plataformas europeias, estratégias de inovação, datificação.

Introduction

Crowdfunding is an innovative and disruptive collaborative funding system, due to its democratic, disintermediated, and entrepreneurial features. Its origins cross the logics of gift (André et al., 2017), open-source culture (Jenkins, 2008), sharing economy (Benkler, 2008) and the financial technology (fintech) industry evolution (Landström, Parhankangas & Mason, 2019). Over the last two decades, crowdfunding (CF) has evolved into different models based on donation, reward, equity and lending systems, developed to provide access to finance for individuals, organizations, and businesses through platform-based sociotechnical infrastructures. The intermediation of a specific type of Digital Business Platforms (DBPs) called Crowdfunding Service Providers (CSPs) supports the creation of CF as social realm and multisided market, bridging the side of creators (campaigns' promoters or founders) with their backers (campaigns' funders, investors or donors) (Ramgaswamy et al., 2020; Dalla Chiesa & Dekker, 2020).

Literature distinguishes between non-financial CF models (or crowdsponsoring, which includes donation-based and reward-based models) and financial CF models (offering monetary returns through lending-based and equity-based models) due to their specific rules, operations, returns and regulation (Zielgler et al., 2019; Belleflamme et al., 2015; Agrawal et al., 2014; C.E, 2010; Chicchiello, 2020; Landström, Parhankangas & Mason, 2019).This research focuses on non-financial models[1], which are adopted to fund social, cultural and civic projects across the globe, involving hundreds of thousands of people and thousands of CSP platforms, within processes of value co-creation, though crowdfunding and crowdsourcing. Co-creation is a key driver for the development and implementation of innovations (Prahalad & Ramaswamy, 2004), and CF is pivoting on such co-creative dynamics, turning itself into a quickly growing market for both platforms' users and owners (Dushnitsky et al., 2014; Ziegler et al., 2019; 2021).

A strand of research drawn from stakeholder theory and Service-dominant logic (SDL) (Vargo & Lusch, 2008; 2009; Gummesson, 2008) to describe CF as sophisticated business and entrepreneurial ecosystem builds on the participation of specialized agents and the inter-relation between convergent services (Rouzé, 2019; Lawton & Marom 2013; Presenza et al., 2019). According to this conceptualization value is not derived by the economic exchange of market offerings, but rather through their use within a context, in which the customers can assess value and always co-creates value (Prahalad & Ramaswamy, 2004).

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[1] Reward-based CF campaigns include the offer of both material and symbolic returns according to funding thresholds, while in CF donation-based financing a campaign is mainly moved by charity, reputational or social motivations (Mollick, 2014). Both these non-financial models can be aggregated into the definition of crowdsponsoring (Landström, Parhankangas & Mason, 2019).

Scholars consider that the most valuable resources are centred on competences, relationships, and information, and these necessary resources applied for service provision may be outsourced to other members of the value network or internalized by the focal organization. The service ecosystems approach guides innovative readings of CF as ecosystem, which main contributions are:

1) CF ecosystem is composed by multiple agents (Quero and Ventura, 2019).
2) CSPs functions depend on the adopted CF model, in which they perform roles as "trusted communication partner, gatekeeper, lobby, resource catalyst, investor relation professional" (Lehner and Harrer, 2019:82).

Thus, from the theoretical lens of service ecosystems and value co-creation, a Crowdfunding Service Provider (CSP) can be seen as an example of contextual innovation in value co-creation (Vargo & Lusch 2008; Quero, Ventura & Keller, 2017) that acts as ecosystem coordinator within a value network (Lehner & Harrer, 2019). Clearly, the advantages of crowdfunding (CF) relate to the wisdom of the crowd (Surowieki, 2005; Benkler, 2006) and its power. On one hand, CF users interact not only to fund projects, but also to exchange knowledge, test ideas, provide feedback and share resources among them. Thus, the value of the crowd can be conceived as plural asset, represented and measured by indicators such as the collected amounts, the volume of backers, and the success rates of campaigns hosted by a certain CSP (Viotto da Cruz, 2018). On the other hand, the concept of crowd-assets (Marom et al., 2015) illustrates how the power and the value of this wisdom of the crowd can be exploited and directed towards different aims and goals, including corporate ones (Rouzé, 2019; Wenzlaff, 2021), providing benefit to corporations acting as campaign creators or matchfunding donors (Dalla Chiesa & Dekker, 2019; Senabre & Morell, 2020).

Crowdfunding Service Providers (CSPs) serve as the essential catalysts for these value forms. According to the conceptualization of the platform society (Van Dijck et al., 2018), which explains the intricate and interdependent sociotechnical infrastructure defining our global reality, CSPs emerge from the financial sector of the three-platform metaphor. This metaphor illustrates the power and control structure that dominates Western societies (Van Dijck, 2020).

The concept of platformization (Van Dijck et al., 2018) is formulated through the critical analysis of global digital platforms, their quick penetration and increasing importance for the activities of people, organizations, and governments, affecting the reorganization of forms of expression, sociability and cultural practices.

Scholars' approach the field adopting multidimensional analytical lens and a sociotechnological perspective on platformization, transcending the idea that platforms' function is merely that of digital aggregators and intermediaries. Our applied theoretical framework articulates three scientific perspectives (political economy, business studies and software), so as to understand the reciprocal influence among the main dimensions of platformization (economical, infrastructural, regulatory), observed in platforms' components: business, infrastructure, and governance (Van Dijck, 2020; Nieborg & Helmond, 2018; Nieborg & Poell, 2018).

Crowdsponsoring CSPs are developed and managed by both for- and not-for profit organizations, competing as digital socio-technical digital intermediaries, ruled by business model and governance policies, within a concentrated CF market that overcomes national borders, despite maintaining some local specificities (Belleflamme et al., 2015; Macchiavello & Valenti, 2023; D'Amato & Casella, 2020). In the global North and in western countries these CSPs vary according to typologies and functions, tending towards the stimulation of the proactivity of its network of users, community building and the guarantee of sustainability within a

market increasingly dominated by few global players[2] and indirectly challenged by other DBPs, such as social networks and other media platforms (Rouzé, 2019; D'Amato e Casella, 2020; Belavina et al., 2020; Tafesse, 2021; Goanta, 2022).

The definition of competitive positioning of a CSP depends on a set of strategic differentiation elements which allow to attract users, other CF market agents and stakeholders. The main dimensions for the CSP's strategic differentiation are the openness level of the market (Thies et al., 2018), the price of transactions (Rangawamy et al., 2020), the quality of projects presented as investment opportunities, the size of its community, the users' experience and interactivity affordances, the customers service support and the levels of participation of the crowd. Innovation and adaptation strategies are built by CSPs on the basis of these elements (Vargo & Lusch, 2008; Belleflamme et al., 2015).

Literature shows that European CSPs increasingly invest in technological innovations to respond to market pressure developing Customer Relationship Management (CRM) systems, automation, social media management systems, artificial intelligence (AI) and gamification (Ziegler et al., 2019; 2020; Brüntje, & Gajda, 2016). From the intersection between platform studies, SDL and digital marketing emerges the idea of transforming the knowledge and resources produced by the crowd, that is, the wisdom of the crowd (Surowieki, 2005) into a renewed "wisdom about the crowd", enriched and datified (Bilton, 2017:86; Kung, 2017; Duffy et al., 2019).

However, there is a gap in the literature approaching how and why different CSPs develop and implement specific innovation strategies alongside their activities, and that are the consequences of the adaptation for the entire CF ecosystem and dynamics of value co-creation concerning the possibilities of empowerment and/or exploitation of the crowd-asset.

Based on literature about service ecosystems and value co-creation related to CSPs, this paper adopts the platformization of society as critical theoretical approach and analytical framework (Van Dijck, 2020; Nieborg & Poell, 2018) to study the relations between human and technological agents within the crowdfunding ecosystem (Lehner & Harrer, 2019). Following the conceptualization of CF as ecosystem, this study assumes that CSPs play multiple roles as ecosystem coordinators (Lenher & Harrer, 2019; Quero & Ventura, 2019; Skirnevisky et al., 2017) and questions both the adoption and consequences of innovation strategies related to value co-creation within diverse CSPs.

Presuming that the evolution of crowdfunding (CF) can be better understood observing the adoption of innovation strategies and their success dynamics (Belleflamme et al., 2013; 2015; Ziegler et al., 2019;2020), we structured the literature review and methodological approach according to the economical, governmental and infrastructural analytical dimensions of platformization.

We design a multiple cases-study (Yin, 2018) to conduct research focused on four CSPs, operating non-financial models at national level in diverse European countries for more than 10 years, to analyse and compare their strategies of innovation and adaptation (Vargo & Lusch, 2008; Brüntje, & Gajda, 2016).

The research objectives are:

1. to identify the main innovations adopted by the four CSPs between 2019 and 2023;

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[2] Scholars identify three leading CFPs responsible for the strong concentration in the Western crowdsponsoring global market: Kickstarter and Indiegogo in the CF reward-based model and GoFundMe in the CF donation-based one (Rouzé, 2019; Lazzaro & Noonan, 2020; Tosatto et al., 2019).

2. to understand the motives for the implementation of innovation strategies, concerning CSP core functions related to governance mechanisms, business models and infrastructural components;

3. to compare the strategic decisions and competitive adaptation from an ecosystemic perspective, explaining how and why these choices affect the dynamics of value co-creation.

Aiming to advance theoretical and empirical understanding of how platformization is playing out in different crowdfunding ecosystems, the paper presents a comparative analysis of four European CSPs: Produzioni dal Basso (Italy), KissKissBankBank (France), Goteo (Spain) e PPL (Portugal).

For each case qualitative and quantitative data are collected using non-participant observation, walk-through method and digital documental analysis. In addition, we interviewed platform manager to clarify the options behind distinctive strategic decisions, related to governance, business model, technological infrastructure and better understand their perspective about innovation and value co-creation.

Findings discuss the implementation of diverse innovations, such as data intelligence systems, social media boundaries resources integration, algorithmic and AI features, reflecting the interrelation between CSP business models, governance, technological and marketing components. We distinguish and explain different strategic approaches that respond to both businesses and users' needs, comparing consequences on the value co-creation dynamics within the four CF ecosystemsL. Each CSP can be characterized by its strategy that can be interpreted as more *preventive, proactive* or *reactive*, and by its infrastructure and data management approach, which can be more *eco-centred* or *ego-centred*.

Literature review

Platformization

Platformization is a dynamic process, occurring in different degrees, which can be driven and defined by the extension and intensity of digital platforms usage ((Van Dijck et al., 2018; Nielsen & Fletcher, 2023). Platform studies is the inter-disciplinary field of research supporting analysis about the role and impact of such platforms and the companies that run them, with implications on how people communicate, use media, access news, information and cultural contents (Duffy et al., 2020; Burgess, 2021; Nielsen & Fletche, 2023). Global platforms' ubiquity, popularity and commercial success relate to their infrastructural role in the informational and media systems as well as their pervasiveness in business and governmental spheres, influencing intricate logics of programmability, connectivity, visibility, control, reputation and datafication (Van Dijck et al. 2018; Nielsen & Fletche, 2023).

Platform strategic definitions allow for an articulation of interactions between the multi-side of the market, setting up business and institutional affairs, as well as improving the algorithms which influence the operations, monetization, content visibility and exposition (Nieborg & Helmond, 2018; Duffy et al., 2019).

Platforms are featured by concertation of power, taking place through three dynamics: 1) the vertical integration of structures; 2) the infrastructuralization of intermediary platforms (related to their extensions in the ecosystem) and 3) the cross-sectoralization of platform activities and influence, reflecting their pervasiveness in multiple areas of the social, commercial and political spheres (Van Dijck, 2020:8).

In Western societies, the global dominant platforms – the so called five Big Tech companies Alphabet-Google, Amazon, Facebook, Apple, and Microsoft (GAFAM) have "largely monopolized the American-based

system", being defined as "orchestrators in the digital ecology value chain" (Van Dijck, 2020:6-7). Nowadays other global organizations are competing for internet users' attention and time, penetrating economic and civic life in most continents, as, for example, the market player owners of technologies such as TikTok or ChatGPT (Van Dijck, 2020; Zhang, 2021; Pan et al., 2023).

The relationship between crowdfunding and platformization remains somewhat ambiguous and has been minimally explored in the existing literature. While there is an apparent connection between the two, driven by technological innovation and shared characteristics among Crowdfunding Service Providers (CSPs) and other digital platforms (Van Dijck, 2020; D'Amato & Casella, 2020; Rouzé, 2019), the exploration of this connection is limited. For instance, Rangaswamy and colleagues have classified various Digital Business Platforms (DBPs), including CSPs and social media platforms like Facebook, Instagram, or YouTube. They established three essential criteria for this classification: 1) the digital performance of matchmaking in two-sided markets; 2) the implementation of direct communications and business transactions between users; and 3) the treatment of users as "independent third parties" maintaining residual property rights over transacted goods and services (2020:76). This classification enables the identification of agents on the demand and supply sides of the market for each platform type, along with key factors influencing DBP success.

Existing research within this domain explores the extent to which various digital platforms influence the entire value chain of digital content and communication, emphasizing trends such as concentration, standardization, individualization, datafication, and commodification of content and users. This body of research sheds light on the dominance and implications for how digital social and cultural practices are conceived, organized, commercialized, measured, tolerated, and regulated (Van Dijck et al., 2018; Nieborg & Poell, 2018; Nieborg & Helmond, 2019; Burgess, 2021; Arriagada et al., 2018). However, the investigation into the penetration and integration of other DBPs into crowdfunding often focuses on user engagement, marketing promotion, sharing power, or social media and network effects (Thies et al., 2018; Burgess, 2021; Punziano, 2022). There is a need for a more systemic approach to research the relations and effects of platformization on the evolution of crowdfunding. This involves explicitly adopting platformization dimensions to analyze CSPs as digital ecosystem coordinators.

Crowdfunding

Crowdfunding (CF) is a dynamic and technology-enabled funding process, marked by market-based approaches for distributed entrepreneurial finance. It involves a collective effort from internet users who come together as a community to support various projects or ideas initiated by individuals or organizations (Parhankangas et al., 2019; Laurell et al., 2019). The complexity of CF has led to the development of taxonomies and diverse academic perspectives, reflecting the continuous evolution of the phenomenon in tandem with social and technological innovations (Behl et al., 2021). This research specifically delves into crowdsponsoring models, and their implementation within Crowdfunding Service Providers (CSPs), which can vary depending on some "flexibility mechanisms". These mechanisms are discretionary governance elements adopted and implemented by CSPs, influencing the campaign's timeframe (one-off or recurrent) and the criteria for fund collection (All-or-Nothing - AON or Keep-It-All – KIA) (Gerber et al., 2012; Mollick, 2014; Kappel, 2008; Dalla Chiesa & Dekker, 2019). The strategic choice of these mechanisms also shapes

the overall business model of the CSP platform, especially in the AON cases. This is because most reward-based platforms derive their business models from direct fees and payment commissions (Mitra & Gilbert 2014; Belleflamme et al., 2015; Mollick, 2014; Ziegler et al., 2019).

Another notable flexibility mechanism is matchfunding, wherein funds are collected through collaboration between individual efforts and donations from affiliated organizations. This practice has gained increasing interest and application, often regarded as a significant component of the adopting CSP's business model, involving partnership agreements with co-funding third parties, such as private or public organizations (IDEIA, 2017; Dalla Chiesa & Dekker, 2020). The implementation of these mechanisms is intricately connected with both governance policies and the technological infrastructure of CSPs.

The literature extensively analyses market data, typologies of Crowdfunding Service Providers (CSPs) and the structure and operations of the European crowdfunding market, contributing to framing its evolution, models, and agents (Belavina et al., 2020). The distribution of crowdfunding activities across different world geographies helps explain the fragmentation of the European market, with the United Kingdom, Germany, and Spain launching the first platforms between 2000 and 2005. The "second wave" (2005-2010) included countries like Italy and France, while activities in Portugal, Finland, and Greece began in 2010 (Ziegler et al., 2019). Following their golden period (2013-2014), crowdsponsoring models CSPs faced market contraction and concentration, prompting the implementation of strategies for sophistication and adaptation (Lazzaro & Noonan, 2020). Increased adoption of hybrid and flexible solutions, and the closure of pioneering CSPs due to financial sustainability challenges under existing business models have been observed (Ziegler et al., 2020; Meoli & Vismara, 2021).

The literature also notes the entry of various players into the global market, with synergies between crowdfunding platforms (CFPs) and institutional agents taking the form of platform ownership agreements (30% of European CFDB CFPs are owned by institutional agents), partnerships, and collaborations (Ziegler et al., 2019: 41). Significant transformations in CSPs' strategies have occurred since 2017, including modifications to business models (82% of CFDB platforms) and the introduction of new products (60% of CFRB platforms).

These changes are attributed to difficulties in maintaining business due to fluctuations in user activity frequency, competition from international generalist CSPs (such as Kickstarter, Indiegogo, and GoFundMe), and the negotiating power of incumbent agents involved in mergers and acquisitions (Youkin & Kashooli, 2018; Dalla Chiesa and Dekker, 2019; Rouzé, 2019). The polarization in crowdsponsoring is evident in transaction volumes, market shares, and the concentration of market power and popularity in a limited number of CFPs headquartered in the USA but operating globally (Lazzaro and Noonan, 2020). The dominance of these CFPs, capturing most of the value reflected in qualitative and quantitative indicators, has led some authors to refer to the existence of a winner-takes-all effect in the CF market (Marom et al., 2015; Rouzé, 2019; Lazzaro & Noonan, 2020).

In the European CF governance context, community policy measures aim to strengthen the cohesion of the regulatory framework, the levels of knowledge and adoption of CF at national and regional level (C.E., 2017). comparative analysis on the European panorama converges criticizing the excessive fragmentation of multiple directives and regulations for the community market (Dushnitsky et al., 2014; Cicchiello 2019; Brüntje, & Gajda, 2016). The consequences of these weaknesses are reflected in the lack of unified mechanisms to guarantee transparency in international operations, in the difficulties of operationalizing

effective CFPs overcoming national borders, reinforcing market polarization and differences between various CFPs (Landström et al, 2019; Hooghiemstra e de Busyere, 2016; Cicchiello, 2020; Macchiavello & Valenti, 2022).

In 2020 the European Parliament approves the text EU 2020/1503 European Crowdfunding Service Providers for Business (ECSPR), aiming to facilitate the scaling up of crowdfunding services across the internal market to increase access to finance for entrepreneurs, start-ups and SMEs. ECSPR introduces an harmonized legal framework, to create a Unique European Market regulating international operations (Hooghiemstra, 2020:1). Literature highlights the growing demand for emerging technologies on CSPs, reflected in investment priorities focusing on technological innovation (Behl, Dutta & Luo, 2021) to meet the goals of users' engagement, and sustained flows of contributions.

According to the survey conducted by the Cambridge Centre for Alternative Finance, The main areas of investment are; the development of integrated Customer Relationship Management (CRM) systems (top priority for 84% of respondents), automation for payments and customer verification (78 % and 50% of answers), promotional and social media marketing tools (45%), community management (42%), Artificial Intelligence (33%) e-learning and gamification (24% and 21%) (Ziegler et al., 2019:102).

The contemporary adoption of Artificial Intelligence (AI) by Crowdfunding Service Providers (CSPs) is a burgeoning phenomenon, with crowdfunding considered a practical application domain for AI big data analytics. Among the most frequently adopted AI tools by CSPs are chatbots, goal search algorithms, and recommender systems, all geared toward real-time communication, better comprehension of user preferences, and anticipation and response to investment choices (Hua & Zheng, 2019). Organizations invest in AI tools designed to automate processes, leverage existing databases, and explore prospects. AI can also be integrated to adapt organizational routine processes, as exemplified by Plum, the AI-powered Facebook chatbot, aiming to enhance visibility and outreach.

However, AI adoption can pose challenges for platforms dealing with non-financial models and social causes, given their potentially limited profitability (Behl, Dutta & Luo, 2021). While incipient literature explores the adoption of AI by non-financial CSPs, seeking to understand how it can serve as a resource for utilitarian benefits and improve overall performance, there is a recognized degree of perceived risks faced by both CSPs and campaign creators (Jin et al., 2019; Hua and Zheng, 2019). These perceived threats often revolve around privacy concerns due to the increased level of information gathered by technological innovation, which goes beyond individuals' control and understanding. Despite these concerns, positive results in terms of efficiency and improved performance, such as faster achievement of financial goals when AI facilitates and catalyses CF activities, prompt CSPs to regularly integrate AI into their daily processes (McKinsey, 2019 in Behl, Dutta & Luo, 2020). Scholars note a lack of research on CSPs' motivations for adopting AI and the role of algorithmic tools in understanding donors' behaviour and stakeholders' engagement.

Methodology

This paper focuses on the implementation of non-financial CF models by four European CSPs, questioning how and why different innovation strategies are implemented by CSPs to play their functions and to adapt

their governance mechanisms, business models and infrastructural components, and exploring the consequences for the value co-creation dynamics within the wider CF ecosystem.

To operationalize the research, we define the three above-mentioned research objectives and design multiple case studies (Yin, 2018), considering the variety of European agents active in non-financial crowdfunding to sample the CSPs platforms according to criteria defined by literature.

The four selected cases respond to common criteria such as: 1) operating at national level the crowdsponsoring model (at least CFRB); 2) being a generalist platform hosting campaigns in different categories; 3) implementing at least the AON mechanism; and 4) leading or co-leading the local market (Ziegler et al., 2019; C.E., 2014; Belleflamme et al., 2013; Rouzé, 2019).

The first screening process identifies more than 50 CSPs (Ziegler et al., 2020), among which we intend to select representatives of platforms launched during all the three waves of European crowdfunding adoption (Dushnitsky et al., 2016) to better understand the evolution of the phenomenon. Additionally, previous research focused on regulation and market evolution, presenting comparative studies about France, Italy, Spain and Portugal (Lazzaro & Noonan, 2020; Macchiavello & Danieli, 2023). We follow this guidance to complete the initial process, adopting manual verification and screening to define the CSPs' sample composition: Produzioni dal Basso (Italy), KissKissBankBank (France), Goteo (Spain) e PPL (Portugal).

The analytical model is operationalized considering the three platformization dimensions and indicators drawn from literature to prepare the analytical grid to state the presence and levels of innovations' adoption. For each CSP we identify the distinctive strategic elements related to the three analytical dimensions that allow the co-creation, retention, and appropriation of value as ecosystem coordinators (Van Dijck, 2020; Nielsen & Fletcher, 2023; Rangaswamy et al., 2020).

Governance dimension: national and international regulation adaptation; internal terms and conditions; ethical code; input control and onboard mechanisms.

Economical dimension: business model component innovations (flexibility mechanisms, matchfunding, partnerships); service and product development (spin-off creation); budgeting and financial performance (investments, costs and monetization strategies).

Infrastructural dimension: interfaces and affordances for user information and communication; automation and CRM systems; specific CSPs' features development and adaptation; social media management, algorithms and AI-powered tools.

Data collection methods include, for each CSP, a combination of documental analysis of multiple sources (see Sources) and activities' reports, FAQs, general conditions and legal terms, online trainings and webinars freely available on their online channels and blogs. We explore the walk-through method and quasi-participant observation to navigate the platform, test affordances, use contents, tutorials and guidelines, customer support and dashboard tools (Silverman, 2013; Rogers, 2017; Punziano, 2023).

Additionally, in April 2023 we conducted semi-structured interviews remotely with platforms' managers to clarify context and motivation of innovations' adoption.[3]. We uniformized varied types of data collected from

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[3] The interviews follow a set of questions related to the analytical dimensions, previously sent by email or LinkedIn to interviewees with the informed consent form. Three interviews were conducted and recorded using Zoom videoconferences tool and manually transcribed, while the fourth set of answers was collected in written format, due to interviewee preference (Silverman, 2013). An ethical code of research was set up and implemented so as to fully ensure the full anonymity of the interviewees and avoid undesired interference with their work duties, responsibility, and environment. Our interviewees were firstly contacted through social media professional profiles and invited to participate

different sources before carrying out the analysis. Triangulation of methods to collect and analyse data supports the identification patterns, seeking to develop illustrative descriptions of the multilayer phenomenon and associated concepts (Punziano, 2023, Silverman, 2013). To guarantee readability and full understanding, each case is first described separately, followed by the construction of a comparative grid to highlight findings on 1) strategies of innovation adoption to compensate for creators' inexperience; and 2) strategies implemented to build and adapt the CSPs' infrastructure and data management approaches.

Case studies

Italy - Produzioni da Basso (PdB)

PdB is the first registered Italian CSP, launched in 2005 and owned by FolkFunding, a benefit company, authorized by the Italian regulator to offer innovation solutions and consultancy in fintech, crowdfunding, and sharing economy.[4] It develops tailor-made professional services, related to different models of CF (financial and non-financial) and sells them to profit and non-profit organizations, through PdB. PdB is characterized by strong reputation and networking capability, media visibility, and a growing team of collaborators (D'Amato & Miconi, 2012). It creates and promotes another digital platform, called Attiviamo Energie Positive (Let's activate positive energies) to disseminate training, contents and podcasts produced by its team and partners. AEP is freely accessible and interlinked with the mother CSP's infrastructure. It is the repository of contents (podcast, webinar and labs) related to crowdfunding, fundraising, innovation, social media networks and Artificial Intelligence, to inform and support creators, to promote CF, to share knowledge and competences and to engage the crowd.

France - KissKissBankBank (KKBB)

KissKissBankBank (KKBB) was launched in 2010 and owned by KissKissBankBank & Co. a private company, that in 2017 sold the CSP to La Banque Postale bank. In 2016 La maison du crowdfunding, a physical store spin-off of KKBB was inaugurated in Paris to engage the local community in crowdfunding projects and campaigns, offering a showroom for presentation, trainings, and related services. Youmatter is a complementary e-learning platform created as media broadcaster of social responsibility oriented to citizens and organizations. In 2017, KKBB co-created, with the same La Poste group, a mobile bank service and application (Ma French Bank) oriented towards affirming its positioning in the fintech and digital banking environment, inviting members of the crowd to co-test the new system (2018) before the official launching (2019). Nowdays, KissKissBankBank & Co. is a foundation with different CSPs referred to as "commited ecosystem"[5].

Spain - Goteo

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in the study. Then they signed an informed consent document to protect their privacy and choose the preferred interview method. The platform' managers of PPL, Goteo and KissKissBankBank participated through Zoom meetings while the PdB manager answered in written format. The answers are quoted and identified by the platform's names and not the individuals' names.

[4] FolkFunding is also the payment agent (authorized ACPR, according to REGAFI n. 72477) of Lemonway, a Payment Institution authorized by the Bank of France to operate in Italy and adopted by PdB.

[5] The ecosystem is composed by the following CSPs: KissKissBankBank (CFRB), Goodeed (CFDB as solidariety advertising), microDON (time donation and solidarity local barter), and Lendopolis (CFEB investment in renewable energies).

The platform was funded in 2011 by Platoniq, an activist NGO, defending horizontal and democratic participation, aligned with open-source and open-knowledge principles. This CSP is currently managed by Platoniq Foundation, being licensed and accessible as free software, as one of the few open-source platforms in the world (Fuster Morell & Senabre Hidalgo, 2020). Goteo focuses on civic crowdfunding, hosting social, cultural, technological, and educational campaigns, related to citizens' initiatives, projects generating collective returns, positive footprints and impacts. Goteo open-source project has a team spread across Spain, supported by multiple organizations and sustained by thousands of activists and volunteers. Goteo envisions internationalization based on alliances and distributed networks of collaboration (promoting shared infrastructures, services, microtask and resources).

Portugal - PPL

The PPL platform was launched in 2011 and nowadays is the only national non-financial CSP in Portugal. PPL owner, developer and manager is Orange Bird Ltd. company, which offers IT services, software development, specialized crowdfunding solutions training and consultancy. Operating under the motto "Collaboration as a service" it provides CF services and manages different CSPs for clients from bank sector and public institutions. Founders are also active in promoting entrepreneurship and crowdfunding, taking part in trainings, contests and events. PPL reflects its Lusophone imprint with national focus and international glaze, and its main strengths are social and cultural crowdfunding campaigns (Foà, 2022).

Table 1. CSPs' descriptive and main performance indicators

	Pdb -Italy	KKBB - France	Goteo - Spain	PPL - Portugal
Year	2005	2010	2011	2011
Ownership changes	Private start-up Benefit company	Private SME Public org./ Foundation	Non-profit foundation	Private SME
Origin sector	ICT	ICT > Banking	Civic activism	ICT
Models of CF	Reward & Donation	Reward	Donation & Reward Crowd-source	Reward Donation (for social)
Specialty and sectors	Social innovation Civic Creativity	Creativity Products	Civic Participative	Social Music Books
Campaigns performance	N.A.	Funded: 28.050	Launched: 2.341 Funded: 1.918	Funded: 1.665
Nº Users	426.850	2.838.152	319.254	227.288
Raised €	24.638.134	157.073.361	18.552.341	7.056.576

Source: own elaboration

Findings

Business models and revenue streams

Concerning the analytic economic dimension, we analyse the key-elements of CSP business models: revenue streams, price strategies, areas of investment and partnership.

Results indicate that CSPs tend to implement diversification of revenue streams, combining resources to survive and adapt their business models, mainly through ownership asset, services, consultancy, and training

provisions, and often operating across adopted crowdfunding models. Focusing on the evolution of operations, since the very beginning of their activities, some of the CSPs adopt a combination somewhere between fees to successful campaigns and selling service provided in the B2B market.

The Portuguese manager explains how this mix was essential to providing sustainability in the mid-term perspective, considering the market transformations that have occurred since they started:

> "We've become national market leaders, but over time, we've encountered phases of both market growth and stagnation. All direct competitors in Portugal eventually withdrew. We understand that challenges are not unique to our context; they occur globally. For instance, even well-known platform brands like Indiegogo took a decade to achieve sustainability. It's a tough journey, made even more challenging with the sophistication of social media platforms, fundraising tools, Patreon, subscriptions, integrated e-commerce. Nevertheless, we are dedicated to demonstrating that crowdfunding can transcend these hurdles and integrate all these aspects into a more connected and authentic community." (PPL)

Literature indicates flexibility mechanisms among the strategic decisions taken by CSPs that influence their business models, and our results confirm the trend of implementation of solutions that facilitate the adoption of Keep-It-All (Ziegler et al., 2020). Even if not present since the launching of the CSPs, nowadays the KIA mechanism is present in all four cases, being available for every creator or, as in the case of PPL, exclusively for some no-profit and social causes campaigns.

Flexibility mechanisms are increasingly featured by fluidity and personalization. New solutions include unique donation and subscriptions and, most of the time, the pricing strategies reflect such variety, as exemplified by PdB, which implements four different mechanisms, with commission fees varying from 3 to 5%, plus transactions costs.

A different strategy of price sophistication is found analysing the KKBB business model. The French platform applies fees to both sides of its market. The fee charged to backers is fixed (2,4%) and the campaign creators can choose to pay it. The fee for campaign creators is a percentage on the amount raised. Both layers have 3 plans (called starter, pro, expert) with relevant differences on offered features, rules and price (from 2,4% to 14,4%). Thus, segmentation criteria adopted by KKBB are different from the usual ones in CF (Ramos & Stewart, 2014) due to the focus being on:

1) levels of frequency/loyalty of usage by creators (one-time donation, recurring donations, or membership);

2) type of creators and needs (distinguished according to features like their previous competences and social networks, capacity to generate a certain average volume of product's orders, request for strategic support and advanced features to optimize the campaign).

This strategy means that creators are distinguished according to their levels of inexperience in CF and project complexity, implying economic criteria to give access to better tools and support for the development of more articulated campaigns. Also, it explains why and how services provided by the CSP – like priority customer service and other technological innovations and affordances for statistics, marketing improvement community management – are locked to some creators.

Such evidence sheds light on the interdependence between business model and infrastructural dimensions within the ecosystem, since trends of personalization of flexibility mechanisms and segmentation of pricing reflect strategies related to technological innovation investment and the sophistication of core CSP function (supporting creators overcome their inexperience) so as to enhance chances of success and gain.

Partnership agreements: valuing money and communication

The development of partnership agreements is another transversal strategy implemented by CSPs to strengthen their business models and to improve the quality of published contents. CSPs perform networking to establish and maintain processes of co-creation of value through the sharing of service related to monetary or other resource exchanges (Prahalad & Ramaswamy, 2004; Gummesson, 2008). By doing this, the CSPs extend their influence power on the ecosystem, through their networks, offering forms of indirect support to both creators' needs: overcoming inexperience in fundraising and funding.

One trend is the strategic development of partnership agreements to improve the quality of campaigns, particularly focused on strategy, contents and dissemination. A second trend is to consolidate partnerships to give impulse to the matchfunding mechanism, which has recently raised the attention of market players (Senabre & Morell, 2020) and has come to be progressively implemented by all analysed CSPs.

Concerning the partnership agreement that involves non-monetary resource exchanges, often CSPs act as matchmaker among professional experts, or companies and the campaigns' creators. Our sample analysis reveals a common strategy between PPL, KKBB, and PdB, which focus on creating a network of organizations, agencies and experts that can 1) act as campaigns' mentor or coaches; or 2) offer professional services for free, or with discounted prices.

Usually, the effort of CSPs to build relationships aims to boost the creators' acquisition of competence in areas such as communication, digital marketing, business management, product development, and social media and community management. Such process has influence and direct consequences on the campaign's creativity, contents, design and engagement strategy.

CSPs' also contemplate benefits, namely related to communication, for mentor or partners involved in such partnership agreements, namely, the improvement of brand reputation and stakeholder management. Completing the non-linear dynamic of value co-creation (Vargo & Lusch, 2009; Quero & Ventura, 2019; Prahalad & Ramaswamy, 2004), it is noticeable that, within the CF ecosystem, these partnerships benefit the CSPs since they can receive service for free (as PPL did for communication design), promotion and extra visibility (as KKBB did for targeted audience from LiveMentor training and consultancy agency, in Figure 1), or business opportunities.

Figure 1. Announcement of trainings on communication and digital marketing for creators, featured by partnership between CSP and external organizations.

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Pour trouver votre clientèle

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The latter is represented by the *PdB Network*, which is one of the strategic assets of the Italian CSP, counting more than 100 organizations and experts that support the quality, prestige, and visibility of campaigns. The Network also eases the funding process, as explained by the interviewee:

> "We invest in the development of our Network and, thanks to that, the matchfunding is growing on PdB. Our platform aggregates on its technological infrastructure all partner organizations that co-develop and launch specific call-to-projects and channels for matchfunding. We are dedicating specific economic investment to develop tailored programs and interface for our matchfunders, like companies and institutions" (PdB).

We also observed that, since its launch, PPL has expanded the strategy of creating dedicated *Channels*, tailored and co-managed with external organizations (such as NGOs, universities, entrepreneurship programs, foundations, media companies) which host, promote and co-fund campaigns. PPL strategy goes even further, directly co-creating and managing some Channels, as the one linked to its publisher (Editora PPL), thus assuming multiple functions along the campaigns and CF product value-chain, being not only the intermediary facilitator, but also the promoter and distributor of final products.

Another strategic approach to partnership is represented by Goteo that focuses on both institutional and collaborative agreements, according to its core values. Institutional partnerships aim to strengthen the matchfunding process, which is one of the main assets of Goteo's competitive advantage[6] constituting a relevant portion of its income. Collaboration is essential as Goteo is licensed and accessible as free software and also facilitates partnership development for infrastructure replicability and scientific research, with publicly available data sources, accessible via the Goteo APIs[7].

Collaboration is the form of partnership built with internet users, who can participate in the Goteo ecosystem, enacting multiple roles not only as "promoters, backers, or proactive collaborators of projects and campaigns", but also as "developers or testers", which are always informed about governance and privacy terms and conditions regarding data protection and use, as explained by the interviewee.

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[6] Goteo only works only with campaigns capable of generating collective returns, and it was a pioneer in creating matchfunding opportunities for projects developed by and in partnership with private organizations and, increasingly, by public entities. The aim is to develop policies that attract new audiences, directly involve citizens, and fulfill mission elements related to the objectives of creating positive social, educational, and economic impacts (Senabre & Morell, 2018; Dalla Chiesa, 2019).

[7] http://developers.goteo.org/

Almost in the opposite pole, KKBB does not link its Network and the matchfunding approach. The latter includes a unique program, run with by the CSP owner La Banque Postal and reaches a limited scope,[8] corresponding to a residual percentage of all KKBB campaigns, drawing more closely to an appropriation of this tool for corporate marketing and branding goals.

To summarize, matchfunding is integrated during different phase of the evolution of each CSP: it is a distinctive element of Goteo's core business and competitive advantage, while KKBB appropriates it to combine with owner corporate branding and Corporate Social Responsibility strategies. In the case of PPL, it raises from market opportunities and helps to strengthen its networks of value-creation through specific partnership agreement. For PdB, in turn, it constitutes a recent area of activity development in which increasing economic, technical, and human resources are invested.

These examples highlight the importance of integrating and coordinating the partnership networks for CSPs to orient the service cocreation according to the multiple objectives of diverse agents within the ecosystem, as well as strengthen the ties between these agents, while keeping a prominent position. The notion of CSP as ecosystem curator (Thies et al., 2018) thus extends the function of input controller, or matchmaker between demand and offer and promotional agent, so as to include the orchestration of other organizations and individuals acting within the ecosystem, here identified as CSP partners.

Findings confirm that partnership and mentorship agreements correspond to CSPs' core functions (Lehner & Harrer, 2019) and business interests (Helmond & Poell, 2018), highlighting the strong connection between business model and governance, while illustrating how diverse strategies reflect interests and objectives of CSP and their owner organizations.

Technological infrastructure: investment and governance

Findings reinforce the importance for CSPs of enhancing the partnership and the quality of relations through their technological interfaces, showing the need for technological investment to support their business models.

Even more since the beginning of the pandemic crisis, all CSPs have come to invest on developing multiple sociotechnical tools and affordances. Our results corroborate the rapid evolution of digital innovations and business intelligence systems adoption and their consistent growth (Ziegler et al., 2020; Bhel, Dutto & Yi, 2020). However, CSPs differ in strategies and capacity to orchestrate their governance and infrastructural components to innovate and take advantage from CRM, algorithmic tools, AI-powered services, and automated recommendation systems in user capacity building processes.

Findings from interviews allow to deduce that, on average, the ICT innovation investment during the last 4 years corresponded to 25-30% of the annual total investment flow of each CSP.

The discussion below illustrates how innovation is applied to enhance CSPs' internal work, back-end functionalities as well as front-end and user activities.

The governance dimension is reflected in each CSP's terms and conditions, including legal terms accomplishing with national legislation and internal policies.

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[8] The unique ongoing program "Coup de Coeur de La Banque Postale" allows the platform's owner to act accordingly to specific strategy of CSR, branding, community and workers engagement: the bank matchfund at 50% one campaign per month, running a community quest to select the beneficiary.

Being already regulated at the national level, all CSPs, according to the implementation of European regulation (EU 2020/1503), complying with DGPR, data collection, and users' verification protocols, implement anti-fraud and anti-money laundering policies (Macchiavello & Valenti, 2023; Goanta, 2020).

Internal policies remit to ethical code and principles of conduct that CSPs establish for all users, as well as flexibility mechanism adoption, like matchfunding rules.

Data policies, terms of personal information treatment firstly aim to protect backers' privacy and their transactions, but also to fit into payment institution policies and guarantee rights and payment to creators. CSPs adopt different data management policies that are tailored to their organizational structure and ownership. Such policies are also oriented to optimize platforms' performance and users' experience. Strategies aims for a certain degree of transparency and sharing. Data management policies also relate to innovation development, and data ownership is a ruling element.

Goteo is a unique and relevant example of openness compared to other cases. Its management affirms that "our data generate value," being used to improve efficacy and impact, boosting "economic relations based on the liberation of data" (Goteo) and allowing the public scrutiny of data flows about funding, campaigns' performance, and backers' behaviors.

It is observed that other governance policies refer to CSPs' rights on campaigns and projects. In some situations, exemplified by the PdB case, the creator concedes a free, unlimited, and gratis license to the CSP to use her personal image, logo and contents like text, video, and images. This license allows the usage of the CSP for promotional, educational, statistical, and analytics aims, on the part of its partners, collaborators, communication, and market research agencies. Concerns have been voiced regarding using creators' data due to anonymized statistics about their projects being transferred and aggregated on the Network when they adhere to a partner's network.

Onboard

In all cases, the onboard mechanism is open and free of costs, only requiring the acceptance of each CSP's legal and ethical terms. This strategy embodies the professed CF values of horizontality, transparency, and the absence of filters or barriers to entry. CSPs establish broader criteria for campaign onboarding, such as "seriousness" in KKBB, or more specific criteria like "compliance with European and national regulations, pertinence and degree of innovation, targeted SDG and footprints, estimated social impact, and outcomes" in Goteo. Until 2019, PPL accepted user log-ins through the Facebook API. However, after becoming the target of suspicion and undergoing an audit by governmental regulators due to controversial campaigns like the "Nurses' strike" (Foá, 2019), it adapted its user registration policy and personnel data gathering practices.

Input control is manually processed by CSP teams, who verify the accomplishment of eligibility criteria and offer support and advice to improve the campaigns. CSPs set up different strategic tools and multiple digital communication channels to facilitate information exchanges between their teams and users and guide creators through more standard manuals, guidelines, and tutorials, or more personalized and direct communications by email, chatbots, or online meetings with campaign managers.

Innovations: integration, digital communication, customer relationship management

During the onboard phase, featured by openness criteria, creators are called to design and provide proof of capacities in dissemination planning and communication management.

The case of PPL is noticeable because the onboard is conceived as an "application process" comprising nine mandatory fields containing the campaign's information, among which only the communication and dissemination plan is "private, it's access (...) restricted to the PPL team, with the creators' communication strategy published on the campaign's page … this is vital information for us, the communication plan is core, it allows us to assess the overall campaigns' quality and forecast results (…)" (PPL).

CSPs invest in innovation development and adoption to improve both campaign proposals and quality and ease CSP's internal operations during the onboard phase, like screening, advising, and validating tasks.

Technological innovations are integrated into both the back-end and front-end and benefits extend from the onboard to the campaigns' launching and running phases.

CSPs address creators with solutions, which vary from more standardized to more customized and interactive, to improve their communication capacities and outcomes.

We summarize below some common trends found in different innovation adoption strategies and deepen the analysis of a few relevant examples:

- CRM and communication automation: analytics software development and updating to monitor indicators of campaigns' performance, statistics, and impact metrics; ranking systems; recommendation systems, alerts, and reminders via direct email to incentivize conversion of campaign visitors into backers; chatbot and interactive tools to facilitate communication between CSP and users, as well as user to user, direct messaging and filters on contact form; pre-formatted messages from creators to backers, emotional reaction's buttons on chat; direct marketing and e-commerce tools.

- Featured interface development and sophistication for specific channels, networks or Sustainable Development Goals (SDG).

- Design and UX: Development of matchfunding system, usability, and improvement of calls to support investors.

- Social media marketing tools to boost engagement, perform retargeting, or improve advertising, for example, using Facebook pixels or plug-ins.

- Business intelligence and promotion: some CSPs also directly invest in their social media pages for advertising.

- E-learning platforms and multimedia content development.

- Digitization of processes signature contracts, payment references, widgets, and co-branding.

Users' dashboard: tools and interfaces

Platform users typically have access to registration and communication tools that are interoperable with social media, CSP's statistics dashboard, and interactive gamified interfaces, featuring a degree of personalization and automation. In most cases, campaign creators have access to personalized and restricted information about performance and engagement on their dashboard.

This information is exclusively related to their campaign metrics, lacking contextualized or easily comparable data about CSP trends. However, some features distinguish each CSPs, as described below.

Goteo offers automated tools to match criteria, calculate impacts and collective returns. The campaign validation is carried out by the CSP team in close collaboration with a community of experts, providing advice to optimize the project. This includes using the best strategies to promote it through Goteo's interface or digital media, adapting the project to a free and open philosophy (types of licenses, products, and derivative services). The responsive design of the dashboard allows creators to access statistics and real-time data about their campaigns' performance and impact. This information can be juxtaposed with other datasets (social media APIs like Facebook, Google Maps, etc.) to improve quality tracking for elements such as dissemination activities, geolocation, and contributions.

KKBB pricing strategies are reflected in the ICT innovation offer to creators. Like most CSPs, the dashboard allows creators to see campaign metrics related to the value of the crowd (Viotto da Cruz, 2018). The KKBB interface includes the conversion rate (from visits to donations), a topic extensively referred to in KKBB support materials and online training. The overall KKBB technological infrastructure integrates a CRM system to reach its visitors, generate leads, and retarget potential backers with automated direct messages. The *pro* and *expert* plans offer different features to creators to create and sustain user engagement, such as campaign pre-launch pages, polls, an internal messaging system, and highlights for featured and exclusive rewards[9]. KKBB offers new campaign features, such as pre-launch pages to facilitate the collection of emails and interest from potential backers, and other functionalities accessible depending on the chosen plan:

- targeted instant messaging and internal inbox systems;
- perk code generation to prompt the interest of creators' community, allowing for a redefinition of specific conditions and spreading the code across social media or direct messages, so as to offer special benefits;[10]
- Facebook pixel installation to improve social media marketing and advertising effectiveness of the campaign, tracking and retargeting users;
- widget to link the campaign pages to creators' external website interfaces, serving as CSP's extension in the digital platform ecosystem (Van Dick, 2020; Duffy et al., 2020).

KKBB also advises creators on measuring the performance of communication actions and suggests to "advanced users" the implementation of three UTM (Urchin Tracking Module) in the URL of each digital promotional communication to track inward traffic and communication effectiveness. Upcoming innovations to be integrated into the technological infrastructure include group discussions, UTM link generators, polls, and statistics export. Recalling the concept of digital platforms' boundaries, resources, and extensions (Helmond and Nieborg, 2018), we observe that the KKBB analytics software tools are supported out-of-the-box by Google Analytics and parse those parameters (utm_source, utm_medium, and utm_campaign) to interpret information, converting it into readable information for creators.

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[9] KKBB provides a dedicated space for the featured reward, pinned on the page to highlight the most relevant and engaging product for promotion. This exclusive reward is part of special tiers, concealed from the general crowd, and specifically offered to target potential backers such as acquaintances and fans.
[10] For example: a competition with a randomly selected winner, invitations to events, additional gift in exchange for more contributions, or a proposal about exclusive partnership addressed to a digital influencer.

PdB exemplifies the disposal of a set of digital tools to enrich the user experience and improve the quality management. The Italian CSP's front-end and back-end interfaces include the CRM system, social media APIs, analytics, and chatbots, aiming to offer campaign monitoring tools, and to improve marketing and customer care operations' efficiency. PdB innovates and develops two spin-offs, integrating external ICT solutions within its own technological infrastructure. This strategy allows for the improvement of the business model, optimizing costs, and providing an enhanced customer relationship management process.

DataCrowd is an algorithmic data intelligence tool able to aggregate and analyze data generated by all PdB ecosystem's agents (creators, backers, followers, managers), contents, and their interactions[11]. Anonymously collected data, in compliance with GDPR and privacy laws through PdB integrated systems, using proprietary and third-party monitoring and analysis tools, allows tracking, processing, visualization, and sharing of data held by the platform. PdB developed algorithms to parameterize data and then to classify ongoing campaigns, displaying the respective daily updated score, actual and predictive trends of performance. Thus, DataCrowd provides each campaign creator with a personalized dashboard[12], with a new classification system and customized analytical and predictive mechanisms.

During a webinar on AEP, PdB management pointed out the limited strategic and analytical skills of average creators, underscoring the significance of online engagement and conversion rates and the quality of DataCrowd automated features, claiming that was as investment not directed at PdB marketing but aimed to support the crowd and the creators. The interviewed PdB manager further explained:

> "the main goals to develop DataCrowd were to improve the quality of projects on the platform and increase conversion rates. Adopting this tool allowed us to collect useful information and analyze data more efficiently, making data-based decisions and providing more targeted support to users" (PdB).

DataCrowd changed the interaction between users and management and simultaneously benefits the PdB management. Its strategic leverage is the PdB technical and infrastructural component that integrates real-time and accurate forecasting data into the back-end and internal management systems, which interoperate front-end and marketing tools. However in 2020 DataCrowd was monetized, being presented on Folkfunding's website as an "external and independent product," a service for sale and a solution "tested internally at PdB, by 80% of creators, allowing to increase by 1% the success rate".

At the beginning of 2023, PdB launched a newly developed tool integrating ChatGPT generative AI service with internal systems such as DataCrowd. The Virtual Manager (beta version) consists of a form with a sequence of standard questions to be answered about the campaign to be launched, freely accessible through PdB's homepage. It is designed to support the pre-onboard phase, offering automated advice and strategic suggestions about contents, communication and promotion to improve the campaigns' chances of success. Its development was motivated by the positive results obtained with DataCrowd.

> "We have noticed an increase in conversion rates and an overall improvement in the quality of projects. This prompted us to provide even more advanced and guided support for campaign creators, assisting them in the

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[11] Data reflect all campaigns' detailed features, users' activities, interactions, and past transactions.

[12] The new dashboard algorithmic component allows creators to: evaluate campaign performance, compare it to past and current trends in the PdB; track page-traffic origin and identify communication activities and media that generate the greatest conversion; predict and quantify the effort required to raise funding while maintaining the current pace of progress.

process of designing their crowdfunding campaign. This allows us to support a greater number of subjects faster and with an ideally unlimited reach." (PdB)

Virtual Manager is an automated tool designed to predict users' needs, and its implementation reduces CSP transaction costs (Rangaswamy et al., 2020). Interviewed PdB manager explains that the economic return on the adoption of innovation is directly measured by analyzing financial data, such as the increase in conversion rates and revenue generated by campaigns. Indirect returns are estimated through the increase in engagement, trust in the platform, and the number of launched projects.

The initial results appear to be positive and satisfactory[13]. Few months later Virtual Manager has been updated to offer automated services to ongoing campaigns, with a primary focus on AI-powered support for communication strategies. The development of technological innovations, such as these, becomes a competitive factor because they allow for optimization of internal human resources work, reducing the pressure on the network of experts, and better satisfying co-investors. Meanwhile, the CSP's organizational structure benefits from tracking, analyzing, and reporting data about the entire crowdfunding process.

The case of PdB illustrates how the model theorized by Gera and Kaur, consisting of four interconnected blocks to cross data on areas such as "prevision, performance and evaluation, recommendation and modeling of users' profile and social analytics" (2018: 57), is now almost fully operational thanks to algorithms and data intelligence systems. However, it's important to note that innovation primarily benefits CSPs' internal work, secondly the creators and is not oriented to support backers' decision-making, even if those constitute a significant portion of the crowd.

Thus, we observe an evolution in the empirical work conducted by CSPs, incorporating the valuable wisdom of the crowd (Surowiecki, 2005). To address solutions to compensate for the inexperience of creators, CSPs initially treated backers as "beta-customers," leveraging the platform's capabilities and expertise by capitalizing on the information at their disposal (Younkin and Kashkooli, 2016:32). While the intrinsic value given to backers' presence, decisions, and investment (Mollick, 2016; Viotto da Cruz, 2016) remains relevant for CSPs' business models, the most valuable aspect of this interaction today is their datafication.

The current competitive advantage and value source come from the datafication of all CSP user profiles, social and economic interactions. CSP capabilities are enhanced by automation and elaboration through algorithms and AI-powered systems, enabling the development of predictive models that overcome some of the limitations highlighted by Younkin and Kashkooli (2016), such as adequate identification of representative signals and valid evidence for decision-making.

The Portuguese case of **PPL** illustrates two trends in CSP's strategic focuses:

1)   the value chain integration (Kueng, 2017) through the referred Editora PPL, which reflects the processes of platformization and datification of cultural production (Poell and Nienborg, 2018).

In 2018, PPL created its own crowdpublisher with a dedicated channel for crowdfunding books and its e-shop to sell campaign outputs such as CDs, art and crafts, books, and magazines. Managers envisioned setting up a tool that could take advantage of the long-tail business model featured on global platforms such as Amazon (Kueng, 2017; Bilton, 2017), adopting a post-sell strategy and earning extra commissions. Due

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[13] After a few weeks, Virtual Manager's activity was interrupted due to the national ban of ChatGPT, imposed by the Italian privacy and data protection Authority. The issue for PdB was resolved within one month with the adaptation of ChatGPT to legal requirements by its owner company (OpenAI).

to limited market response, the strategy quickly changed to pre-sell, increasing the campaign and product creator's responsibility, and focusing on the specific crowdfunding category (books) in which PPL invests more, creating its own crowdpublisher brand.

2)   The multiple investments on social media engagement and digital advertising (Van Dijck, 2020; Duffy et al., 2020). This includes 3 years of direct investment in social media advertising (on Meta group) to promote posts on PPL's pages about ongoing campaigns reaching a certain target goal (50% of budget or 20 backers) and was supported by outsourcing social media marketing operations.

PPL also encourages creators to directly engage in social media marketing, investing money and effort in visibility and community management. Due to this its CRM system was improved on the front-end with gamification and visual tools to monitor the campaigns' performance over time and to reward them. Each week, PPL defines the top five performing campaigns that deserve privileged spaces of visibility on its homepage or on social media pages. On the other hand, PPL positions itself as an intermediary supplier of paid social media marketing services for campaigns. The investment proposed by PPL to creators appears to be associated with a combined mechanism of trust, reputation, and the reach of the PPL brand, promising a wider potential audience for the campaign.

Another trend involves a unique solution to deeply involve creators in social media marketing: the MultiPPLicador. This iniciative aims to encourage and monetarily reward campaigns that generate greater engagement with Facebook users through integrating the affordance of the Facebook plug-in. The mechanism utilizes a social media extension (linked to each campaign's page) to count engagement interactions and monetarily reward campaigns with up to 200 interactions (200 interactions = €20; an extra €30 for those reaching 500 interactions). PPL values social media engagement as an indicator of value creation, a measurable, concrete result worthy of compensation.

The publicly stated purpose is the expectation of increasing the number of "people launching and promoting campaigns" (PPL). However, the initiative is also oriented towards optimizing the organic electronic Word-of-Mouth (e-WOM) generation about PPL on social media.

In 2018 the incentive mechanism was revised and presented as a "collaborative marketing tool," a form of co-creation related to campaign objectives. The counter parameters changed (200 interactions = €10, 500 interactions = €20) and further decreased in 2019 (200 interactions = €10). To run the MultiPPLicador, PPL created a specific user-profile responding to the company's email, which has backed 440 campaigns (until 2020). Carrying out a default estimate calculation, Foá (2022) concluded that PPL made a minimum investment of more than €4,400 in 4 years.

Asked about the reasons for implementing the MultiPPLicador and the methods of measuring the effectiveness of social media engagement activities, the PPL manager states that they daily consult the analytics systems integrated into the technological infrastructure.

The MultiPPLicador represents a mechanism of reciprocity:

> "(…) to convey to the creators that we are not just hosting the campaigns, but, in any case, we want to support them because we also have a reward; that is, we have a return on this. For us, it is much better, more valuable to give money to encourage those who create the campaigns (…) it is actually much more worth the work of paying for the effort and engagement that comes from the promoters, which is much more organic." (PPL)

Results discussion

Monetizing crowd-assets: contents and interactions

The comparative analysis of CSPs allows us to understand the strategic priorities underpinning their business models and identify their main monetization strategies related to crowd assets (Marom et al., 2015) and value co-creation within the crowdfunding (CF) ecosystem. Common features include the introduction of matchfunding, the hybridization and personalization of flexibility mechanisms, and the presence of commission fees.

The observed pricing strategies and the hybridization of flexibility mechanisms indicate that CSP business models are oriented toward satisfying different needs of diverse types of creators, segmenting them to finally monetize their content and interactions. The results reinforce previous statements about creators being the most important side of the non-financial crowdfunding market and the main asset to create and aggregate value in crowdfunding ecosystems (Foà, 2022; Thies et al., 2018).

Results allow us to conclude that KKBB and PPL exemplify the trend of monetizing the contents co-produced with their users (creators and backers, as well as network partners), meaning campaigns and their final outputs. In addressing creators' inexperience, these CSPs focus attention and improvement on targeting strategies and segmentation according to campaigns' final products. At the same time, each platform's business model is based on pricing strategies and revenue sources set up according to such dedicated options, creating premium offers or exclusive services, relying on co-production (Prahalad & Ramaswamy, 2004). Particularly, the case of PPL shows how CSPs can also invest in campaigns directly, to reward their social media engagement performance, or indirectly, by offering privileged spaces of visibility and promotional mechanisms for products that generate returns beyond usual commission fees, recalling the concept of co-promotion explicated in the literature (Quero & Ventura, 2019).

On the other hand, Goteo and PdB exemplify the trend of monetizing social interactions, owing to the pivotal role that technological innovation development, business intelligence, data management and analysis, and monetization have in their business strategies. Both transform social interactions into co-created value propositions, but it's important to highlight relevant differences in their business model strategies.

PdB directly sells products and services co-created and co-tested with the crowd (Quero & Ventura, 2019), monetizing data analysis, aggregation, and transformation.

Goteo co-generates value from its policies and principles, opening access to sources of value such as data and knowledge, thus monetizing (through individual donations and subscriptions, public subsidies, and commissions on consultancy and projects) its own work and brand as an open-source CSP and value-creation service, operationalizing its mission and its accomplishment.

The effects of platformization are thus reproduced within different national CF ecosystems, while the processes and consequences of commodification of users as resources for value creation through their time, attention, interactions, and cultural productions are evident.

Non-neutral roles of CSPs: data analysts and translators

The investment of CSPs in innovation and technology development has grown in recent years, influencing not only their affordances and interfaces but also the sustainability and adaptability of business models,

along with the development of capacities to perform new functions within the ecosystem. Firstly, we conclude that the datification of the crowd-asset has become an implicit constitutive element of crowdfunding (CF), evolving into a trend that permeates the business logic of ecosystems and guides the strategic decisions of CSPs regarding innovation development and investment. The study recognizes the multiplicity of roles played by CSPs (Lehner and Harrer, 2019) as CF intermediaries and ecosystem curators. We argue that CSPs directly intervene not only in campaigns' quality (D'Amato & Casella) but also in campaign funding (acting as co-creators, backers, or match-funders) and communication.

Throughout the evolution of the crowdfunding (CF) phenomenon, the ability to navigate content production, dissemination strategies, traffic tracking, and performance measurement has become increasingly competitive and essential for both creators and CSPs.

CSP managers often express concern about the lack of medium to advanced knowledge and competencies among creators, allowing us to point to a perceived lack of users' digital literacy, particularly in digital communication and marketing. Therefore, CSP development of solutions addressing creators' inexperience becomes a critical strategy that intersects CSPs' marketing, innovation, and commercial objectives.

Our findings highlight strategies involving investments in innovation to provide more preventive tools (used before onboarding and launch) or more reactive tools (during and after onboarding), increasingly automated and integrated with CSP analytical systems. These findings underscore the centrality of communication in the entire CF process and argue that communication is the first step in the value co-creation process resulting from the partnership between CSPs and creators, shaping the CF ecosystem.

The major contribution of the research lies in shedding light on CSPs' roles and how they intervene at multiple stages of the CF value chain, including promoting, distributing, and directly selling final products. Moreover, CSPs operate not only as data aggregators and intermediaries (Gera and Kaur, 2018) but also as data analysts, data translators (transforming and displaying data to ease users' access and comprehension), and developers of data intelligence systems. This supports our assertion about data analysis being a strategic function in the CF value chain, similar to the media and creative sectors (Kueng, 2017).

We state that CSPs are developing a new function of data analysts that facilitate the creation and retention of value, transforming the "wisdom of the crowd" (Surowiecki, 2005) into "wisdom about the crowd" (Bilton, 2017). Our findings add novelty to crowdfunding and platform studies by demonstrating the non-neutrality of CSPs as ecosystem coordinators. They have a direct influence on the dynamics of valuation of both products and social interactions, participating in the aggregation, transformation, and retention of co-created value within the service ecosystem.

CSPs strategic approaches

CSPs employ different strategies to adopt and integrate innovation within their business models and technological infrastructures to fulfil the role of compensating for the inexperience of creators. They leverage both the "wisdom of the crowd" (Surowieki, 2005) – collective results from interactions, decision-making, output, and outcomes – and the "wisdom about the crowd" (Bilton, 2017) – aggregated data, trends, and forecasting models. The features of each CSP can be consulted, in summarised version, in Table 2 of the annex section of this article. The comparative analysis of the four cases allows us to identify both preventive and reactive strategies. Additionally, we highlight the variety of capacities, intentions, and strategies related

to the usage and redistribution of the value created, acquired, and aggregated through data. In reference to the crowdfunding ecosystem theoretical framework (Lehner & Harrer, 2019; Quero & Ventura, 2019), we conclude that each CSP can be characterized by its infrastructure and data management approach, metaphorically being either more *eco-centered* or *ego-centered*.

PdB: preventive and proactive strategy and an eco-centred approach

PdB's approach to investment in innovation development and integration is preventively oriented to reduce onboarding and engagement costs. To support the inexperience of creators, PdB develops algorithmic and AI tools for analyzing, cross-referencing, and enriching data (originated by the wisdom of the crowd) and delivers results to creators, enhancing their strategies and performance. Using DataCrowd and Virtual Manager, creators have access to sophisticated and tailored information, along with a personalized analytic system related to general internal trends and predictive patterns.

The CSP returns the wealth to the crowd, reformulating it into algorithmically crafted wisdom, simplifying data visualization, improving activities and content developed on its platform to obtain better results and knowledge, and to perform its own intermediation work in a more efficient and competitive way. Thus, PdB adds wisdom about the crowd to the enhanced wisdom of the crowd, derived both internally and externally (through Open AI or Alphabet) to its system. This approach fosters co-creation between agents within the ecosystem, thus constituting an example of an eco-centered data management model within the wider ecosystem.

This investment in data intelligence and innovation development reflects the strategic orientation of PdB. Such tools primarily aim to benefit the CSP's structure, management, and business model, being instrumentalized and capitalized for that purpose. Firstly, they benefit internal operations and competitiveness, adding automation and standardization to systems used to monitor and forecast onboard and campaign performance. Secondly, they offer a double benefit to the CSP owner, who starts to sell new products and services fed and tested by the community and larger ecosystem data.

In the case of PdB, we observe a strategy of infrastructural integration between GAFAM extensions (APIs, analytics software, AI) and internal development of proprietary innovation tools. This strategy is based on a mixture of data control and enrichment to create additional knowledge, introducing new parameters to measure, support, and forecast better performance. Thus, PdB has set a route to return value to all creators through freely available tools and, indirectly, to the crowd by increasing the quality of campaigns. On the other hand, this strategy preserves the PdB business model by not disclosing economic information and technical data. It protects intellectual property and involves direct selling of new services that have been incubated and enhanced in co-creation with the crowd.

KKBB: reactive strategy and ego-centred approach

KKBB's approach to investment in innovation development and integration is reactive, as it offers limited technological innovations embedded in its infrastructure and relies on external digital business platforms (such as Pixel or UTM parameter tracking) to support creators. Over time, KKBB has invested in an increasingly segmented payment and metered system of user relationship management, indicating the availability of technological innovations within its back-office infrastructure, accessible to creators willing to

pay. KKBB's infrastructure uses analytic tools and parameters based on Google's activities, and through this integration, it retains wisdom about the crowd, returning to creators only the wisdom of the crowd related to their campaigns, without further contextualization or forecasting models. The strategic orientation and adaptation strategies of KKBB seem to be determined by the ownership of the platform.

Goteo: preventive and proactive strategy and eco-centred approach

Goteo prominently declares its commitment to the principles of the open-source economy, solidarity, and collaborative platforms. The distinctive traits and brand identity of the platform align with values such as free knowledge, prosocial behavior, and open-code philosophy. Goteo not only provides direct access to the wisdom of the crowd, encompassing data, code, and knowledge, but also offers tools to leverage wisdom about the crowd. This implies the possibility and instructions for fully reproducing a crowdfunding service platform (CSP) like Goteo. Successful experiments of such duplication have been conducted, including one in Japan. Results demonstrate that Goteo follows a preventive and proactive strategy in adopting and integrating innovations to support creators. This is exemplified by the platform's affordances to simplify onboarding mechanisms, such as calculators and measurements for evaluating Sustainable Development Goals (SDG), pertinence, impact, and footprints. As previously mentioned, Goteo's strategic orientation is reflected in its monetization strategy. The platform sells the power and efficiency of the Goteo brand, which embodies its principles and operations. Importantly, Goteo maintains an eco-centered data management approach.

PPL: preventive and proactive strategy and ego-centred approach

PPL adopts a preventive approach to support creators through the Challenge training mechanism, benefiting both its marketing efforts and lead generation. The introduction of MultiPPLicador exemplifies how a CSP seeks to maximize and compensate user efforts in co-creating value through promotional activities (Quero & Ventura, 2019). However, it also highlights the prevailing logics of commodification of social media engagement and attention. This move indicates how CSPs can be influenced by Digital Platform Business (DPB) logics, influencing strategic decisions about investment and branding.

Likewise KKBB, PPL aggregates and retains the wisdom of the crowd, returning to creators only the wisdom of the crowd aggregated by their own business and campaigns. However, PPL appears to adopt a more ego-centered approach to data management. While the CSP aggregates wisdom about the crowd from the wisdom of the crowd, using an internal Customer Relationship Management (CRM) system and external analytics tools, the sharing of wisdom about the crowd with its users is limited. The creator, through the dashboard, is not directly provided with the opportunity to control the campaign's performance in terms of traffic, engagement, or comparison with other campaigns.

Our empirical research illustrates the diverse strategies implemented by CSPs to manage, share, and transform data between CSPs and users. Comparative findings reveal that all CSPs establish various forms of alliances and partnerships with creators, highlighting the notion that communication serves as the initial step in the value co-creation process resulting from the partnership between CSPs and creators.

The entire CF ecosystem is structured around value propositions that rely on communication as a service, and as a consequence, it is influenced by power dynamics related to communication. Service-Dominant Logic

(SDL) suggests that all organizations face the challenge of aligning competences to establish and maintain relationships with ecosystem agents, enabling them to both import inputs and generate revenues (Gummesson, 2008; Lusch, Vargo & Tanniru, 2010; Akaka, Vargo & Lusch, 2012). Our analysis demonstrates that, for all crowdsponsoring CSPs, creators play a vital role. The crowd serves as both a source of input and a source of revenues, with creators acting as direct promoters of this circular pattern of value co-creation. Each CSP develops different strategies of adaptability, based on resource and data management investments, to address users' needs through preventive or reactive approaches.

Conclusions

The inquiry into how the evolution of non-financial crowdfunding is impacted by the phenomenon of platformization prompted the development of a comparative case-study research (Yin, 2008; Macchiavello & Valenti, 2023; Lehner, 2013). The objective was to advance theoretical and empirical understandings of how platformization manifests itself in various crowdfunding ecosystems. Service-Dominant Logic (SDL) literature emphasizes that within value networks, the most valuable resources revolve around competences, relationships, and information, underscoring the significance of Information and Communication Technology (ICT) (Gummesson, 2008; Akaka, Vargo & Lusch, 2012). The triangulation of data highlights a significant focus on communication as a strategically pivotal dimension. This is evident in governance policies, serving as an input control criterion, infrastructural innovations (design, user experience, tools for competence building), and business model adaptations related to cost and investment priorities. Findings confirm that the governance dimension both influences and is influenced by the business model of each platform, illustrating how communication is integral to both value aggregation and retention processes (Van Dijck, 2020). This is further exemplified by analyzing CSPs' data and business intelligence management strategies, or social media engagement strategies.

The success of CSPs appears increasingly dependent on digital communication and marketing, with a notable emphasis on developing multiple solutions to address creators' inexperience serving as major evidence. In conclusion, communication emerges as a central pillar for the co-creation of value between the creator and the hosting CSPs within the crowdfunding ecosystem.

The findings identify how CSPs' investment commences during the pre-onboard phase and lasts throughout the campaign period, facilitated through co-promotion, particularly in digital and social media marketing.

Aligning with literature that underscores "constant adaptation as a winning strategy". CSPs must continuously adapt to develop the most compelling value proposition, establishing a connection between competences and relationships, to remain competitive. The relative performance advantage depends on the capacity to revise value propositions in response to a changing customer landscape, considering the influence of global Digital Platform Business (DBP) networks (Lusch, Vargo & Tanniru, 2010: 25).

Our findings constitute a novelty within crowdfunding studies, demonstrating the non-neutrality of CSPs as ecosystem coordinators, exerting direct influence on the dynamics of valuation of both products and social interactions. CSPs participate in the aggregation, transformation, and retention of co-created value within the service ecosystem. The strategic option of configuring resources for the best value, creating density,

can allow CSPs to achieve higher density by altering the structure of the value network (Lusch, Vargo & Tanniru, 2010).

The co-creation of value, in line with service ecosystem theory (Lusch & Vargo, 2008), unfolds in crowdfunding, involving a diverse composition and plethora of agents. This research sheds light on the roles of CSPs' partners, which are coordinated by the platform. According to our research, other digital business platforms exert both direct and indirect influence on the crowdfunding ecosystem.

Recent literature has started considering the indirect role of social media platforms in the crowdfunding (CF) ecosystem, focusing on their potential influence on campaign success (Viotto da Cruz, 2018) and the evolution of regulatory systems (Goanta, 2022). Our study goes beyond this assumption by demonstrating a growing infrastructural interdependence. Through analysis of how different CSPs use and integrate various dominant global digital platforms, we aim to understand the level of platformization (Rangaswamy et al., 2020; Nielsen & Fletcher, 2023) within CF ecosystems. The research reveals how CSPs' evolution is influenced by platformization processes, encompassing both positive and negative consequences. CSPs are shaped by global dominant Digital Platform Businesses (DBPs), not only in their technical functioning but also in strategic mindsets and approaches, where commodification aligns with the capitalization of resources and assets co-created with the crowd and the larger ecosystem.

We observed the pervasive and extensive presence of boundary resources linked to Digital Business Platforms (DBPs), including social media integrations, third-party software, tools, APIs, plug-ins, and analytics, across all CF ecosystems. This trend reflects an increasing dependency on digital business platforms, such as the GAFAM (Van Dijck, 2020) and recent market players like Open AI.

Earlier concerns about the standardization of campaigns and formats due to CSP influence (Rouzé, 2019) are now amplified by the normalization and extensive use of algorithms to produce knowledge, make decisions, and recommend digital content. Furthermore, we are witnessing the first wave of massive usage of generative AI, which can significantly alter our conception, understanding, and acceptance levels of originality and standardization in production, predictability of behavior and success factors, as well as the commodification and monetization of users' value.

In conclusion, the impact of platformization on the evolution of crowdfunding (CF) becomes evident through the widespread adoption of standards, metrics, and tools generated and controlled by global digital business platforms, such as GAFAM, to predict and validate performance and success. The process of structuring relational dynamics that determine the co-creation of value within the CF ecosystem is influenced both explicitly and implicitly by Crowdfunding Service Providers (CSPs). Explicitly, CSPs influence through the definition of governance policies, service fees, and affordances. Implicitly, they attribute dimensions and meanings of value to the interactions generated between users and contents, captured through the sociotechnical infrastructure. Both implicit and explicit influences of CSPs on their ecosystem are adjusted by the technical, economic, and socio-cultural impact of larger Digital Business Platforms (DBPs) on the CSPs, which shape their strategic orientation and differentiation.

An additional noteworthy aspect arising from the analysis is the solutions CSPs provide to address creators' inexperience. CSP managers express concerns about the lack of medium to advanced knowledge and competencies among creators, emphasizing the critical role of users' digital literacy, particularly in digital communication and marketing.

The services provided by CSPs are increasingly dependent on and strongly oriented toward a specific mindset and set of competencies that reflect and support the dominant usage of the most popular Digital Business Platforms (DBPs). This indicates that the investment logic and training approach of CSPs as creators' partners are both increasingly affected and dependent on the dominant logic that shapes the wider society of platforms. Our research highlights a real and perceived risk of growing dependence of CSPs on GAFAM, pointing to business, marketing, and control goals as the main motivations for CSP managers to adopt and integrate GAFAM extensions. The study integrates the theoretical configuration of the crowdfunding ecosystem offered by scholars (Lehner & Harrer, 2019; Quero & Ventura, 2019) by adding and explaining the roles and influences of these agents.

The results contribute to the ongoing discussion about the risks and benefits of integrating human processes with automation, algorithmic-driven forecasting, and AI-powered systems. There is an acknowledgment of the existence of standardization trends and homogenization risks, which could potentially outweigh the benefits of information readability and ease of comparison, leading to a reduction in decision-making time. The discussion on the dependence on GAFAM of multiple crowdfunding ecosystem agents (CSPs, partners, creators, and backers) points to evolution trends influenced by innovation and platformization, bringing forth associated risks.

1. Greater probability of homogeneity between campaigns supported and advised according to algorithmic and predictive logics;
2. Datification and commodification of increasingly automated and algorithmically powered users' experience to favor platform business model, in contrast with crowdfunding projects that remain focused and dependent on
3. human-powered interactions;
4. Indirect but effective competition in service provision between social media and CSP within the industry of collaborative funding.

This study has some limitations related to the sample size and the lack of more detailed data about the financial and social engagement performances of each CSP. Future studies could address these limitations by delving deeper into the motivations driving the development and adoption of specific innovations. Analyzing how CSPs establish investment priorities and integrate various systems, as well as evaluating the impacts and returns of these innovations, would provide a more comprehensive perspective on the crowdfunding ecosystem.

Moreover, expanding knowledge from the users' perspective would be valuable. Considering the impact of innovations on users' experiences and how these innovations affect CSP performance are interconnected concepts that warrant further exploration. Unfortunately, studies on these aspects in the context of crowdfunding are still relatively scarce. Conducting research in these directions can enhance our understanding of the crowdfunding landscape.

Future research will benefit from bringing together these theoretical perspectives (crowdfunding and platform studies) and collect more empirical data adopting the proposed grid, following the trends of crowdfunding evolution. Opportunities for future research include a deeper investigation into the factors influencing the selection of a specific digital business platform for fundraising. A comparative analysis of

decision-making processes between global social media platforms (such as Twitch, Instagram, TikTok) and crowdfunding service providers (CSPs) could offer valuable insights into the dynamics of the crowdfunding landscape.

Acknowledgment

Online sources

Pdb -Italy	KKBB - France	Goteo - Spain	PPL - Portugal
Platform & Virtual Manager page	Platform	Platform	Platform
Podcasts/Webinars	YouTube tutorials videos	Training Guide	Online training
Creators Guide	Creators Guide/Blog	Blog	Blog
Terms & Conditions	General conditions Legal terms	Terms & Conditions	Legal terms
www.attiviamoenergiepositive.it	www.aide.kisskissbankbank.com http://Youtube@KissKissCamp www.livementor.com/kisskissbankbank	https://github.com/GoteoFoundation	www.facebook.com/pplcrowdfunding/ https://orange-bird.pt

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Annex 1. Comparative results on main variables and governance, economic and infrastructural dimensions of CSPs

Dimension	Variables	Pdb -Italy	KKBB - France	Goteo - Spain	PPL - Portugal
Governance	Anti-fraud policy	Yes	Yes	Yes	Yes
	National regulation adaptation	CF intermediary registration	CF intermediary registration	CF intermediary registration	CF intermediary registration and backers' data transparency
	Ethical code principles	Disintermediation No entrance barriers Self-regulating community	Free creativity Participation	Open access and open knowledge Transparency Collaboration and active horizontal participation	Democratic access Participation Free creativity
	Input control	Manual	Manual	Manual w/experts	Manual
	Onboard criteria	Open form + ethics guidelines	Open form + ethics guidelines	Common good Social commitment Social media accounts	Open form Communication plan
	Matchfunding explicit policy	Yes	No	Yes	Partially
Economic	Flexibility mechanisms	AON KIA Unique- Simple donation	AON KIA Subscription Pre-order	AON KIA Once - flexible	AON (KIA only Social)
	Matchfunding	Partners network	Exclusively by CSP owner	Partners network	Partners network
	Partnerships	Network of +100 w/ channels	>30 technical experts and mentoring organizations	Public bodies w/subventions Network + 30 w/ channels	External technical experts Internal Network of +10 w/ channels
	Direct monetary investment in campaigns	No	Yes, one matchfunding per month at 50%	No	MultiPPLicador social media engagement incentive
	Spin-off	E-learning AEP community	3 CSP Mobile bank co-creation Showroom	Hackathon Trainings #LEARNBYFUNDING	E-shop
	Investments in ICT	Data intelligence Algorithm development AI ChatGPT integration New interface tools (SDG & matchfunding) AEP platform	CRM Analytics tools for back- and front-end New tools and affordances for paid plans	UX & Design Due diligence Digital contracts SDG	UX & Design Dashboard's gamification Social Media ADV & management
	Monetization strategy focus	Interactions	Contents	Interactions	Contents
Infrastructural	CFP Statistics	Yes	Yes	Yes - detailed	Yes
	CFP features	DataCrowd Virtual Manager Widget	Widget Polls Chatgroups	APIs Open source code	Challenge Widget
	CRM system	Yes	Yes	No	No

DBPs' integration	Plug-ins Analytic software APIs Chatbot ChatGPT	Plug-ins Analytic software Pixel APIs	Plug-ins APIs	Plug-ins Analytic software Pixel APIs
SDG & impact calculators	Yes	No	Yes	No
Automated recommendations	Yes	Yes	Yes	Yes
Pre-launch page	No	Yes	No	No
Social media integration in campaign page	Yes	Yes	Yes	Yes
Dashboard analytics and visualization tools	DataCrowd	Performance UTM traffic parameters	Performance	Performance Gamification
Communication tools for users	Inbox messages	Targets and personalization	Inbox	External email messages
Generative AI integration	Yes	-	-	-
Innovation to support creators	Preventive and proactive	Reactive	Preventive and proactive	Preventive and proactive

Source: own elaboration