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Three Essays on Platform Strategy and Growth

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Tres ensayos sobre estrategia y crecimiento de plataformas

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THREE ESSAYS ON PLATFORM STRATEGY AND GROWTH

Abstract: This dissertation examines platform strategy and growth. It consists of three chapters that shed light on a relatively novel phenomenon – i.e., strategic partnerships of a platform. Chapter 1 builds an integrative literature review on platform strategy to provide a comprehensive overview of the current state of literature in various fields. Chapters 2 and 3 are empirical studies that use a novel, hand-collected sample of 32 equity crowdfunding platforms across Europe. Specifically, Chapter 2 investigates how and when the resources that a platform provides to its complementors through external partners can affect the growth of the platform. We find that there are strategic tradeoffs to platform growth through partnerships. While partnerships may increase the number of complementors entering the platform, the average size of such complementors is smaller. Chapter 3 studies how platform competition affects the strategy of a platform to engage in partnerships. We find that, after an increase in competition, only platforms with high market share and high levels of distinctiveness engage in partnerships. The studies offer several implications for platform managers, complementors, and regulators and provide directions for future research.

TRES ENSAYOS SOBRE ESTRATEGIA Y CRECIMIENTO DE PLATAFORMAS

Resumen: Esta disertación examina la estrategia de plataforma y el crecimiento. Consiste en tres capítulos que proyectan luz sobre un fenómeno relativamente novedoso: las asociaciones estratégicas de una plataforma. Capítulo 1 construye una revisión de literatura integradora sobre la estrategia de plataformas para proveer una visión comprensiva del estado actual de la literatura en varios campos. Capítulos 2 y 3 son estudios empíricos que utilizan una muestra novedosa y recopilada manualmente de 32 plataformas de crowdfunding de inversión en Europa. Específicamente, Capítulo 2 investiga cómo y cuándo los recursos que una plataforma proporciona a sus complementadores a través de socios externos pueden afectar el crecimiento de la plataforma. Encontramos que existen compensaciones estratégicas para el crecimiento de la plataforma a través de asociaciones. Las asociaciones pueden aumentar el número de complementadores que ingresan a la plataforma, pero el tamaño promedio de dichos complementadores es menor. Capítulo 3 estudia cómo la competencia entre plataformas afecta la estrategia de una plataforma para involucrarse en asociaciones. Encontramos que, tras un aumento en la competencia, solo las plataformas con alta participación de mercado y altos niveles de diferenciación se involucran en asociaciones. Los estudios ofrecen varias implicaciones para los gerentes de plataformas, complementadores y reguladores, y proporcionan direcciones para futuras investigaciones.

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CONTENTS

THREE ESSAYS ON A PLATFORM STRATEGY AND GROWTH

INTRODUCTION

Platforms are "meta-organizations" with a structure more formal than that of open markets but less organized than that of traditional firms (Kretschmer et al., 2020). Platforms use modular structure to attract and support a diverse group of market actors on its multiple sides (Baldwin & Woodard, 2009). The supply side market actors – i.e., complementors – use the platform to create value and sell their products or services to the demand side – i.e., platform users (Rietveld & Eggers, 2018). Complementors may not have the right resources or incentives to contribute to the platform ecosystem in a performance-enhancing manner (Cenamor & Frishammar, 2021). Hence, platforms use various strategies to build, manage, and grow the platform ecosystem (Chen et al., 2022). To gain a comprehensive understanding of platform ecosystems, it is essential to comprehend these strategic decisions and examine their tradeoffs in pursuing platform growth (Cennamo & Santaló, 2013; Karhu et al., 2024).

In this thesis, we address these research points with a three-project study. In the first chapter of the dissertation, we build a semi-systematic literature review (Snyder, 2019) on platform strategy and growth to understand the extant knowledge of this phenomenon. we collect data on the articles published in the FT50 journals including the fields of management, information systems (IS), and marketing from 1990 to 2024. we offer two main contributions 1) identify and propose a novel categorization of platform strategies, and 2) highlight the extant research on platform value creation strategies using an antecedent-strategy-consequence framework (e.g., Davis & Luthans, 1980). In the second and third chapters of the dissertation, we hand-collect and empirically examine a sample of 32 equity crowdfunding (ECF) platforms in Europe from 2012 – i.e., the emergence of the industry – to 2022 to understand the platform strategic decisions to engage in partnerships. Particularly, we look at

how these decisions are affected by increasing competition, and the tradeoffs in platform growth through these partnerships.

ECF platforms allow complementors (i.e., startups) to raise capital from the users (i.e., a crowd of investors) in exchange for firm equity (Estrin et al., 2018). ECF is growing in popularity among entrepreneurs as an effective way to raise capital (Cumming et al., 2021). Startups use an ECF platform to develop a crowdfunding campaign on the website that generally lasts between 30 and 60 days (Lagazio & Querci, 2018). The funded startups and the investors are part of the ECF platform ecosystem until the startup gets acquired, launches an IPO, or files for bankruptcy and investors accordingly get a return on their investments.

ECF platforms are an appropriate context to examine platforms' strategic decisions and their tradeoffs in pursuing platform growth. ECF platforms are an alternative to traditional methods of startup financing such as venture capital funding (Vulkan et al., 2016). Venture capitalists are experts who not only invest money in a startup but also other valuable resources such as knowledge and networks (Sapienza, 1992). Similarly, ECF platforms not only mediate the flow of money between users (investors) and complementors (startups) but also the flow of resources and services between service providers (SPs) and complementors (Stevenson et al., 2023). This makes ECF platforms a right setting to study the effect of partnership between a platform and SP on the growth of the platform.

As outlined earlier, in the first chapter of this thesis, we build a semi-systematic review of the literature on the strategic decisions of platforms. The objective of the literature review is twofold: 1) to highlight the different strategic decisions taken by platforms, and 2) to identify the various interdependencies of these decisions. By analyzing 212 articles published in the fields of management, IS, and marketing between1990 and 2024, we identify the strategies that platforms use to make decisions regarding value creation, value capture, and scope. We further categorize platform value creation strategies into decisions related to

technology, intermediation, resources and services, and engagement. Subsequently, we integrate the research on these themes to highlight the antecedents and consequences of these platform strategic decisions. By synthesizing the emerging findings, we provide a comprehensive overview of the dynamic landscape of platform decision-making, shedding light on the tensions and research gaps in the literature.

In the second chapter, we empirically examine how and when the resources that a platform provides to its complementors through external partners can affect the growth of the platform. We draw from the literature on platform ecosystems that argues that around platforms a community of independent SPs sell their resources and services to the complementors (Cutolo et al., 2022), and from the resource-based view, which states that the strategic partnerships of a platform with such SPs can help it gain competitive advantage (McIntyre & Srinivasan 2017; Park et al., 2004). we use a novel hand-collected dataset of 32 equity crowdfunding platforms across 12 European countries from the inception of the industry in 2012 to 2022. We collect data on the crowdfunding campaigns and platform partnerships from the platform websites and triangulate it with data from established databases such as Pitchbook and Crunchbase. We find that while partnerships are effective in attracting complementors to the platform, there are strategic tradeoffs to platform growth. Specifically, since smaller complementors require resources and support from platforms, partnerships provide higher value to them, decreasing the overall complementor size on the platform. We further find that this tradeoff is more pronounced for diversified platforms.

In the third chapter, we empirically study the effect of platform competition on a platform's decisions to engage in partnerships. We argue that, on the one hand, providing resources to complementors through partnerships may increase the platform's competitive advantage (Li et al., 2023). On the other hand, partnerships may also increase the risk of platform disintermediation (Gu, 2024). Our results suggest that the effect of platform

competition on platform partnerships is significantly moderated by platform market share and distinctiveness, such that platform with high market share and high distinctiveness are more likely to engage in partnerships following competition.

Throughout the three chapters of the thesis, we offer novel insights to the management literature on platforms. Firstly, the semi-systematic review of the literature in chapter 1 uncovers current knowledge on the strategic decisions taken by a platform, thereby equipping scholars and managers with a comprehensive understanding of tradeoffs in pursuing platform growth through these strategies. Second, by examining the influence of partnerships on the attractiveness of a platform for complementors in chapter 2, we identify the strategies that platforms can use to attract complementors and stimulate ecosystem growth. Specifically, we find that, while partnerships increase platform attractiveness for the complementors, the attractiveness is limited to smaller complementors. Lastly, the findings in chapter 3 on platform competition sheds light on how platforms can effectively use partnership as a strategy to respond to increase in competition. Overall, these findings carry significant implications for managerial decision-making, particularly within platform ecosystems, and regulations.

TRES ENSAYOS SOBRE ESTRATEGIA Y CRECIMIENTO DE PLATAFORMAS

INTRODUCCIÓN

Las plataformas son "meta-organizaciones" con una estructura más formal que la de los mercados abiertos, pero menos organizada que la de las empresas tradicionales (Kretschmer et al., 2020). Las plataformas utilizan una estructura modular para atraer y apoyar a un grupo diverso de actores del mercado en sus múltiples lados (Baldwin & Woodard, 2009). Los actores del mercado del lado de la oferta –es decir, los complementadores– usan la plataforma para crear valor y vender sus productos o servicios al lado de la demanda –es decir, los usuarios de la plataforma (Rietveld & Eggers, 2018). Los complementadores pueden no contar con los recursos o incentivos adecuados para contribuir al ecosistema de la plataforma de una manera que mejore el desempeño (Cenamor & Frishammar, 2021). Por lo tanto, las plataformas emplean diversas estrategias para construir, gestionar y hacer crecer el ecosistema de la plataforma (Chen et al., 2022). Para obtener una comprensión integral de los ecosistemas de las plataformas, es esencial comprender estas decisiones estratégicas y examinar sus compensaciones en la búsqueda del crecimiento de la plataforma (Cennamo & Santaló, 2013; Karhu et al., 2024).

En esta tesis, abordamos estos puntos de investigación con un estudio de tres proyectos. En el primer capítulo de la disertación, construimos una revisión semi-sistemática de la literatura (Snyder, 2019) sobre estrategia y crecimiento de plataformas para comprender el conocimiento existente sobre este fenómeno. Recopilamos datos sobre los artículos publicados en las revistas FT50, incluidas las áreas de gestión, sistemas de información (IS) y marketing, desde 1990 hasta 2024. Ofrecemos dos principales contribuciones: 1) identificar y proponer una nueva categorización de estrategias de plataformas, y 2) destacar la

investigación existente sobre estrategias de creación de valor en plataformas utilizando un marco de antecedente-estrategia-consecuencia (por ejemplo, Davis & Luthans, 1980). En el segundo y tercer capítulo de la disertación, recopilamos manualmente y examinamos empíricamente una muestra de 32 plataformas de crowdfunding de inversión (ECF) en Europa desde 2012 –es decir, el surgimiento de la industria– hasta 2022 para comprender las decisiones estratégicas de las plataformas para involucrarse en asociaciones. En particular, analizamos cómo estas decisiones se ven afectadas por el aumento de la competencia y las compensaciones en el crecimiento de la plataforma a través de estas asociaciones.

Las plataformas de ECF permiten que los complementadores (es decir, startups) recauden capital de los usuarios (es decir, una multitud de inversores) a cambio de acciones de la empresa (Estrin et al., 2018). El ECF está ganando popularidad entre los emprendedores como una forma efectiva de recaudar capital (Cumming et al., 2021). Las startups utilizan una plataforma de ECF para desarrollar una campaña de crowdfunding en el sitio web que generalmente dura entre 30 y 60 días (Lagazio & Querci, 2018). Las startups financiadas y los inversores forman parte del ecosistema de la plataforma de ECF hasta que la startup es adquirida, lanza una OPI o se declara en quiebra, y los inversores obtienen un retorno de sus inversiones en consecuencia.

Las plataformas de ECF son un contexto apropiado para examinar las decisiones estratégicas de las plataformas y sus compensaciones en la búsqueda del crecimiento de la plataforma. Las plataformas de ECF son una alternativa a los métodos tradicionales de financiamiento para startups, como el capital de riesgo (Vulkan et al., 2016). Los capitalistas de riesgo son expertos que no solo invierten dinero en un startup, sino también otros recursos valiosos como conocimiento y redes (Sapienza, 1992). De manera similar, las plataformas de ECF no solo median el flujo de dinero entre los usuarios (inversores) y los complementadores (startups), sino también el flujo de recursos y servicios entre los proveedores de servicios (SP)

y los complementadores (Stevenson et al., 2023). Esto hace que las plataformas de ECF sean un escenario adecuado para estudiar el efecto de la asociación entre una plataforma y un SP en el crecimiento de la plataforma.

Como se mencionó anteriormente, en el primer capítulo de esta tesis, construimos una revisión semi-sistemática de la literatura sobre las decisiones estratégicas de las plataformas. El objetivo de la revisión de la literatura es doble: 1) destacar las diferentes decisiones estratégicas tomadas por las plataformas, y 2) identificar las diversas interdependencias de estas decisiones. Al analizar 212 artículos publicados en las áreas de gestión, IS y marketing entre 1990 y 2024, identificamos las estrategias que las plataformas utilizan para tomar decisiones sobre la creación de valor, la captura de valor y el alcance. Además, categorizamos las estrategias de creación de valor en plataformas en decisiones relacionadas con tecnología, intermediación, recursos y servicios, y compromiso. Posteriormente, integramos la investigación sobre estos temas para resaltar los antecedentes y las consecuencias de estas decisiones estratégicas de las plataformas. Al sintetizar los hallazgos emergentes, proporcionamos una visión integral del panorama dinámico de la toma de decisiones en plataformas, arrojando luz sobre las tensiones y lagunas de investigación en la literatura.

En el segundo capítulo, examinamos empíricamente cómo y cuándo los recursos que una plataforma proporciona a sus complementadores a través de socios externos pueden afectar el crecimiento de la plataforma. Nos basamos en la literatura sobre ecosistemas de plataformas que argumenta que alrededor de las plataformas, una comunidad de SP independientes vende sus recursos y servicios a los complementadores (Cutolo et al., 2022), y en la perspectiva basada en recursos, que establece que las asociaciones estratégicas de una plataforma con dichos SP pueden ayudarla a obtener una ventaja competitiva (McIntyre & Srinivasan 2017; Park et al., 2004). Utilizamos un conjunto de datos novedoso recopilado manualmente de 32 plataformas de crowdfunding de inversión en 12 países europeos desde el

inicio de la industria en 2012 hasta 2022. Recopilamos datos sobre las campañas de crowdfunding y las asociaciones de plataformas de los sitios web de las plataformas y los triangulamos con datos de bases de datos establecidas como Pitchbook y Crunchbase. Encontramos que, si bien las asociaciones son efectivas para atraer complementadores a la plataforma, existen compensaciones estratégicas para el crecimiento de la plataforma. Específicamente, dado que los complementadores más pequeños requieren recursos y apoyo de las plataformas, las asociaciones brindan un mayor valor a ellos, lo que reduce el tamaño promedio de los complementadores en la plataforma. Además, encontramos que esta compensación es más pronunciada para las plataformas diversificadas.

En el tercer capítulo, estudiamos empíricamente el efecto de la competencia entre plataformas en las decisiones de una plataforma para involucrarse en asociaciones. Argumentamos que, por un lado, proporcionar recursos a los complementadores a través de asociaciones puede aumentar la ventaja competitiva de la plataforma (Li et al., 2023). Por otro lado, las asociaciones también pueden aumentar el riesgo de desintermediación de la plataforma (Gu, 2024). Nuestros resultados sugieren que el efecto de la competencia entre plataformas en las asociaciones de plataformas está moderado significativamente por la participación de mercado y la diferenciación de la plataforma, de tal manera que las plataformas con alta participación de mercado y alta diferenciación son más propensas a involucrarse en asociaciones tras la competencia.

A lo largo de los tres capítulos de la tesis, ofrecemos nuevas perspectivas a la literatura de gestión sobre plataformas. En primer lugar, la revisión semi-sistemática de la literatura en el capítulo 1 descubre el conocimiento actual sobre las decisiones estratégicas tomadas por una plataforma, equipando así a académicos y gerentes con una comprensión integral de las compensaciones en la búsqueda del crecimiento de la plataforma a través de estas estrategias. En segundo lugar, al examinar la influencia de las asociaciones en el atractivo de una

plataforma para los complementadores en el capítulo 2, identificamos las estrategias que las plataformas pueden usar para atraer complementadores y estimular el crecimiento del ecosistema. Específicamente, encontramos que, si bien las asociaciones aumentan el atractivo de la plataforma para los complementadores, dicho atractivo está limitado a complementadores más pequeños. Por último, los hallazgos en el capítulo 3 sobre la competencia entre plataformas arrojan luz sobre cómo las plataformas pueden utilizar efectivamente las asociaciones como una estrategia para responder al aumento de la competencia. En general, estos hallazgos tienen implicaciones significativas para la toma de decisiones gerenciales, particularmente dentro de los ecosistemas de plataformas, y las regulaciones.

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Chapter 1

Platform Strategy: A Semi-Systematic Review of the Literature on Platform Value Creation and Growth

Abstract: During the last decade, the growing phenomenon of platforms has attracted significant attention from the management scholars. However, the complexities and interdependencies in platform decision-making generate ambiguities in our understanding of the consequences of such strategies not only for the growth of the platform but also for the complementors. This paper traces all the published management literature on this phenomenon "back to its roots" and critically examines all these theoretical and empirical studies. We analyzed a dataset of 212 articles on platform strategy published in the FT50 journals between 1990 and 2024. This semi-systematic literature review has two primary objectives. Firstly, we seek to revise, organize, and make sense of existing publications on platforms strategy, identifying emerging themes of research. Second, we categorize the existing body of work that investigates the antecedents and consequences of platform decisions and develop a theoretical framework that synthesizes and integrates the literature on platform technology, intermediation, resources and services, and engagement decisions.

Keywords: platform strategy; platform growth; strategic tradeoffs; literature review.

PLATFORM STRATEGY: A SEMI-SYSTEMATIC REVIEW OF THE LITERATURE ON PLATFORM VALUE CREATION AND GROWTH

INTRODUCTION

In recent years, the emergence of digital platforms has revolutionized the landscape of many industries and transformed the way businesses operate. The disruptive nature of the platforms is due to their unique meta-organizational design that is more hierarchical than open markets but less formal than traditional firms (Kretschmer et al., 2022). This design allows platforms to attract complementors – i.e., external market actors who use the platform technology to build products and services and sell to the platform users (Cennamo, 2021). While platforms can hyperscale by relying on the complementors (Giustiziero et al., 2023), the added layers of value creation make the administration of the ecosystems challenging (Tiwana et al., 2010; Wareham et al., 2014). Furthermore, complementors typically are small actors who might not have the resources necessary to add significant value to the platform ecosystem (Yoo et al., 2024). In this article, we reflect on platform research in information systems (IS), management, marketing, and other fields to give a comprehensive overview of how platforms support and orchestrate complementors in value cocreation on the platform and what are the antecedents and consequences of such strategies.

Platform strategy refers to the decisions taken by a platform to build, govern, and grow the platform ecosystem (Cusumano & Gawer, 2003; Hagiu & Wright, 2011; Tiwana, 2013). The extant research in management on platforms has highlighted two principal points of differentiation between platforms and traditional firms (McIntyre & Srinivasan, 2017). First, platforms exhibit network effects whereby the utility of a user depends on the other users on the platform (Parker & Van Alstyne, 2005). The network effects can act as a valuable

resource and increase entry barriers, promoting the platform strategy to focus on building an extensive installed base even at the cost of short-term losses (Evans & Schmalensee, 2010; Rochet & Tirole, 2003).

The second point of divergence between platforms and traditional firms stems from the interdependencies and power struggles between the platform owners and the complementors (Boudreau & Hagiu, 2009; West, 2003). Complementors, who are typically small, might need significant number of resources and support from platforms to contribute to the value cocreation (Panico & Cennamo, 2022) but they are also vulnerable to platform coercion (Cutolo & Kenney, 2021). For example, it might be in the interest of a platform to promote a particular group of complementors at the cost of the others (Rietveld et al., 2021). Hence, platforms employ a variety of orchestration strategies to address the unique challenge of balancing competition and collaboration with complementors, as well as managing value creation and capture dynamics (Saadatmand et al., 2019).

The literature on platforms in various fields has looked at various strategies platforms use to orchestrate the ecosystem (McIntyre & Srinivasan, 2017) and gain a competitive advantage (Rietveld & Shilling, 2021). The literature in IS predominantly looked at strategies related to platform technology and architecture (Facin et al., 2016), works in economics have largely studied platform strategic decisions to price and bundle the products (Gao, 2018), and management and marketing research has especially focused on platform governance decisions such as providing rewards and certifications (Chen et al., 2022). However, the research in these fields has developed in isolation and lacks an integrated view of the strategic decisions taken by platforms and their dependencies.

We argue that a comprehensive view of literature on platforms is especially important given the complexities of promoting platform growth. For instance, during the early stages of the lifecycle, platforms face problems such as "chicken-and-egg" (Caillaud & Jullien, 2003)

and "cold start" (Ye et al., 2023), in which a platform lacks sufficient data to personalize products and the presence of a large number of complementors, resulting in extremely low value derived by a user from the platform. Such dynamics may restrict the growth of the platforms, but once overcome, may act as an entry barrier for the competition (Katz & Shapiro, 1994).

Furthermore, initially regarded as a “winner-takes-all” market, increasingly scholars have highlighted the strategic tradeoffs in platform growth (Cennamo & Santaló, 2013). Specifically, platforms can grow not only by increasing the number of complementors and users but also by the complementor quality, size, and variety, and platforms face tradeoffs in pursuing these growth strategies at the same time (Karhu et al., 2024). Therefore, the importance of comprehending how platform strategic decisions might affect their growth is central to building an inclusive understanding of a platform ecosystem. Hence, we depart from previous literature reviews such on network effects (McIntyre & Srinivasan, 2017), platform competition (Rietveld & Schilling, 2022), and platform governance (Chen et al., 2022), to shed light on platform value cocreation strategies – i.e., the different mechanisms platforms employ to support and orchestrate complementors in value cocreation on the platform and what are the antecedents and consequences of such strategies.

To address this gap, we build a semi-systematic review of the literature (Snyder, 2019) by collecting data on platform articles published in the fields of IS, management, marketing, and others from 1990 to 2024. We rely on the literature review article by Rietveld & Shilling (2021) to guide our search of published articles. Initially, similar to Rietveld and Shilling (2021), we systematically trace all of the literature on platforms “back to its roots” (Callahan, 2010, p. 301). This integrative literature review seeks to advance our understanding of platforms in three specific ways. First, we extend the sample of our data up to 2024 which gives us a significant temporal advantage. We identified a total of 722 articles on platforms,

up from the 333 articles they initially analyzed. We narrow down the 722 articles to 212 articles that are published in Financial Times 50 (FT50) journals and study platform decision-making (i.e., although important, we remove the articles on complementor strategy from the scope of this review).

Second, instead of building a systematic literature review of the different themes on the phenomenon, we take a semi-systematic approach (i.e., more integrative in nature) in highlighting actionable platform strategies of the various empirical and theoretical articles in our sample (e.g., Moschieri & Mair, 2008). That is, advancing Rietveld and Shilling (2021), we move beyond the identification of the themes covered by prior works to develop a new critical categorization of the literature on platform strategy. That is, we manually code each article in our sample to highlight the various platform strategies. We do not use a priori set of arguments to guide our interpretation of the studies that we review, rather, we let our review of the literature show us what is interesting and useful in moving research forward (Callahan, 2010).

Finally, we develop a novel categorization of the existing body of work that investigates the antecedents and consequences of platform strategies. From the insights and categorization arising from the review, we develop a theoretical framework (Elsbach & Van Knippenberg, 2020), which synthesizes and integrates the literature on platform technology, intermediation, resources, and engagement decisions, advancing our knowledge on platform strategy (e.g., Chen et al., 2022; Rietveld & Shilling, 2021). Through our article, we emphasize the need for a more inclusive and diverse understanding of platform strategies and their effect on platform growth, promoting rigorous and interdisciplinary scholarship in the realm of platform ecosystems.

LITERATURE REVIEW

Platforms and their Strategy

Platforms are meta-organizations that have a technological core and a modular periphery (Kretschmer et al., 2022). Platform owners build the technological core and frequently update it to increase its relevance (Gawer, 2014). Furthermore, platforms adopt a modular structure that allows a variety of complementors to use the platform technology and cocreate products (Jacobides et al., 2018). In doing so, platforms outsource value creation to complementors and play an important part in orchestrating the ecosystem to deter opportunistic behavior and foster growth. Specifically, they focus on building network effects (McIntyre & Srinivasan, 2017; Rochet & Tirole, 2003) and the coopetitive dynamics among the market actors on the platform (Gawer, 2009; McIntyre et al., 2021).

Network effects or network externalities arise when the utility of a user depends on the other users of the firm (Katz & Shapiro, 1985). Network effects play an important role in platform ecosystems. They can not only serve as a valuable resource to attract a large number of users but also deter competition by increasing entry barriers (Fuentelsaz et al., 2012). Therefore, platforms make strategic decisions to gain an initial installed base and regulate network effects. For example, platforms can provide incentives to complementors to overcome the "chicken-and-egg" problem (Caillaud & Jullien, 2003) or even purposely design features that will promote network effects (Ploog & Rietveld, 2024). The literature on network effects has also highlighted how they can promote the growth of the platform (for a review, see McIntyre & Srinivasan, 2017).

On the other hand, the literature on coopetition between platforms and complementors and among the complementors (Kretschmer et al., 2020) looks at how platforms use various strategies to orchestrate the ecosystem (Chen et al., 2022). Platform modularization and fungible resources allow them to attract a large number of complementors to cocreate value for the platform users (Jacobides et al., 2018). However, platforms can also develop negative externalities over time (Karhu et al., 2024). For example, platforms with a large installed base

may promote “free riding” behavior or complementor opportunism (Cennamo & Santaló, 2019). Platforms may also face a high level of “disintermediation” from the complementors and the users (Gu & Zhu, 2021). Hence, platforms actively manage the ecosystem to realign the incentives and provide greater value to the complementors and users.

Platform Growth

Platform growth signifies the expansion of a platform’s ecosystem regarding the number of users, transactions, and complementors (McIntyre et al., 2021). Platforms have effectively disrupted industries, largely because they can grow more rapidly and broadly than traditional companies (Gawer & Cusumano, 2014). Specifically, their unique design and resources enables them to simultaneously hyperscale and hyperspecialize (Giustiziero et al., 2023). However, platform design also makes the growth of a platform dependent on its ability to attract and retain both demand-side (i.e., users) and supply-side market actors (i.e., complementors; Boudreau, 2012; Cennamo, 2021).

Complementors, the independent market actors that integrate their products and services with the platform, play a vital role in platform growth (Cenamor, 2021). Their contributions increase the value of a platform for the users. Complementors are responsible for not only satisfying the heterogeneous requirements of the users (Rietveld & Eggers, 2018) but also increasing the innovativeness of the ecosystem (Dedehayir et al., 2018). For example, the success of app-based platforms like Apple’s App Store and Google’s Play Store depends significantly on the ecosystem of developers that continuously create and update applications (Agarwal & Kapoor, 2023). Hence, there are interdependencies in the growth of the platforms and the growth of the complementors.

However, once seen as a WTA market, platforms have limitations to their growth (Cennamo & Santaló, 2013). These limitations arise as the users not only care about the number of complementors but also their characteristics such as size and diversity (Rietveld &

Eggers, 2017). Specifically, platforms face various strategic tradeoffs in growing their complementor base and complementor quality and innovativeness (Karhu et al., 2024). Hence, to gain a comprehensive understanding of a platform ecosystem, it is important to understand what platform strategies are and how they affect the different dimensions of platform growth.

DATA COLLECTION

Our review relies on the collection and analysis of academic articles that focus on platforms and their strategic decisions of platforms, tracing this work "back to its roots" (Callahan, 2010, p. 301). The research on platforms has developed in various fields, including economics, IS, strategy, operations, and marketing, but, largely, remained in isolation. One of its consequences has been on the slow adoption of the term "platform," which has also been called, for example, "two-sided market" and "intermediary firm" (Thomas et al., 2014). A comprehensive literature review should capture articles based on the context and phenomenon irrespective of the term used for its reference.

Recent literature reviews have highlighted this concern and gone to a length to solve the issue (for example, see Chen et al., 2022; Rietveld & Shilling, 2021). In fact, Rietveld and Shilling (2021) maintain a website, platformpapers.com, that keeps track of all the articles being published on platforms. As a starting point for our analysis, we download the list of all papers tracked by the website. We conclude our data extraction in September 2024 with 722 articles published between 1970 and 2024, significantly greater than the 333 articles analyzed by Rietveld and Shilling (2021).

Second, of this initial selection of works, we focus on the 421 articles that are published in the FT50 journals for our review. Although applying this filter involves significant compromises, such as the underrepresentation of non-management journals, we believe it's critical to preserve the coherence of the examined articles and their applicability to

the management audience (Fassin, 2021). We refine our sample selection to remove the literature review and perspective articles from our analyses.

In the third step, we further differentiate from the existing literature reviews such as on network effects (McIntyre & Srinivasan, 2017), platform competition (Rietveld & Shilling, 2021), and platform governance (Chen et al., 2022) by analyzing the articles on platform strategy and highlighting their interdependencies. That is, while previous literature reviews have been thematic and systematic, we take a more integrative approach and highlight the relationships between platform strategy and growth (Elsbach & van Knippenberg, 2020; Snyder, 2019). Following the common approach among semi-systematic and integrative reviews (e.g., Moschieri & Mair, 2008), first, we perform a thematic analysis and then integrate the literature using antecedent-strategy-consequence model (Cronin & George, 2023). We do this by manually going through the full text of each of the 421 articles published in the FT50 journals on platforms. We develop thematic codes related to platform strategy (Braun & Clarke, 2006). Specifically, we capture whether an article studies platform decision making, and if yes, we develop zero order codes for the platform strategy. Out of the 421 articles, we have included 212 articles in our final sample that study platform decision making. Finally, we categorize the zero order codes (i.e., literature on platform strategy) to make a novel classification and highlight the interdependencies of these strategies. We detail our analysis of the 212 articles below.

FINDINGS

Evolution and Thematic Analysis of the Literature on Platform Strategy

Platform Strategy is defined as the actions taken by a platform to design, govern, and grow the platform ecosystem (Tiwana, 2013). Platforms are multisided firms that connect the users and complementors. A platform strategy, therefore, focuses on attracting and orchestrating these market actors to spur growth. Platform strategy has received significant

attention from the scholars in the fields of IS, management, and marketing (Rietveld & Shilling, 2021). The researchers in IS typically view a platform as a technology architecture with a core and a peripheral component (Gawer, 2014). They have shed light on the decisions of a platform related to technology compatibility and quality (Facin et al., 2016). Relatedly, the management stream views a platform as a meta-organization that intermediates the transactions between the complementors and users and plays an active role in their orchestration (Kretschmer et al., 2022). The marketing scholars have focused on the optimal advertising design and pricing model of the platform (Wu, 2015).

We initially engage in a descriptive analysis of the articles on platforms published in IS, management, and marketing journals. Figure 1 shows the evolution of the articles on platform strategy in these fields from a chronological perspective. Our data underscores the growing importance of this research area, with over 50 percent of the studies published within the last three years. The timing of our analysis thus has a clear temporal advantage compared to previous literature reviews that extended until 2019 (Rietveld & Shilling, 2021) and 2021 (Chen et al., 2022).

---INSERT FIGURE 1 ABOUT HERE---

Furthermore, out of the 50 journals listed in the FT50, 20 have published articles on platform strategy. Among the 212 articles in our sample, 89 were published in Information Systems (IS), 66 in management (including strategy), and 48 in marketing, while the remainder were published in operations and statistics. In this review, we bring together the literature from these streams and highlight - 1) the strategic decisions taken by a platform and 2) the antecedents and consequences of such decisions. First, we go through each article in our literature review to capture the platform strategies discussed in the article. An integrative review of platform strategy is especially helpful given the need to bridge the findings from multiple fields (Cronin & George, 2023). We follow Braun and Clarke (2006) to develop

"bottom up" coding of the platform strategy studied by the articles in our literature review. Figure 2 presents a pictorial view of the codes and themes developed. The zero-order codes or platform strategies are the raw strategies that we identify in each article. These codes are highly reflective of the article field, and research methodology. Such as theoretical articles have broader constructs, while empirical articles have specific actionable decisions taken by the platforms. In total, we identify 80 platform strategies studied by the 212 articles in our sample.

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To make sense of these platform strategies, we classify the zero-order codes into first- and second- order codes. The first order codes bring together the different terminologies and different perspectives of similar strategies under a common umbrella to provide an integrative view of the literature. It is further meaningful to classify these first order codes into categories (second-order codes) that would help a scholar or a manager to gain understanding of a particular aspect of platform strategy. We perform multiple iterations to categorize the zero-order codes into first- and second-order level groupings of platform strategies (Braun & Clarke, 2006; Snyder, 2019). Our grounded theory approach gave us a novel categorization of platform strategy. While in our first- and second-order codes we find platform strategies also identified by the previous literature reviews such as sharing resources and providing certifications to the complementors (Chen et al., 2022) and platform entry into complementor space (Zhu, 2019), we also develop novel platform strategy categorizations such as platform partnerships to provide ancillary services to the complementors and platform strategy to develop communication channels between complementors and users.

We further expand that these strategies can be broadly classified into three descriptive themes pertaining to platform contribution in value creation, mechanisms to capture value, and strategy to promote platform scope and growth. The value creation strategies involve

building the platform architecture and orchestrating the ecosystem. Such strategies allow platforms to help complementors build and deliver products to the platform users. Second, the value capture strategies refer to the monetization of the product and services. These strategies include signing contracts with the complementors and users, relocating the surplus, and developing additional revenue streams such as advertising. Finally, platforms make strategic decisions regarding the scope of the platform. It includes defining and expanding platform boundaries, establishing and coordinating relationships, and making strategic investments, for example, in marketing, research and development (R&D), and corporate social responsibility (CSR) activities.

---INSERT TABLE 1 AND FIGURE 3 ABOUT HERE---

Table 1 and Figure 3 shows the distribution of article on these three themes in the fields of IS, management, and marketing. Notably, a majority of the articles – 116 out of 212 articles – examine platform strategic decisions aimed at value creation in the ecosystem, while another 43 articles focus on platform value capture and 53 on platform scope strategies. It also indicates that value creation has received significant attention from all three fields led by IS, and then management, and marketing, respectively. The platform value capture strategy has been leading in IS and marketing, while management has paid significant attention to platform scope strategies.

The Emergent Conceptual Framework

For further analyses, we integrate the literature on platform value creation strategies. We specifically focus our literature review on value creation strategies due to the number of articles published in this area and the interdisciplinary nature of the research, as highlighted above. Appendix Table 2 lists all the articles in our sample that study these strategies. We map the studies on platform value creation using an antecedent-strategy-consequence model (e.g., Halder et al., 2021; Hoskisson & Hitt, 1990; Wu et al., 2020).

The value creation strategies capture the decisions of a platform to support and orchestrate the complementors and users on a platform. Unlike traditional firms, platforms do not sell their own products (Hagiu et al., 2022). They build the platform technology to cocreate products with the complementors. However, complementors are generally small firms and individuals who alone might not have the resources to create value. Hence, platforms strategically support complementors in the value creation.

---INSERT FIGURE 4 ABOUT HERE---

Platform value creation strategies have received significant attention in the three fields – i.e., IS, management, and marketing. Figure 4 shows the evolution of the literature on platform value creation over the years. We note a growing trend of the number of articles published in FT50 journals on the topic. In total, there are 116 articles on the topic from 1980 to 2024, our sample period. Although for the first ten years of our sample, there is no article on platform value creation strategies – i.e., the oldest article in our sample was published in 1990. In table 2, we highlight the research methodologies of the articles published in different fields. We observe that there empirical and modeling studies have been dominant across the fields, although, management scholars have also preferred qualitative design.

---INSERT TABLE 2 ABOUT HERE---

In our second-order codes (as shown in Figure 2), we find that platform value creation strategies can be grouped into four categories – namely, technology, intermediation, resources and services, and engagement. This is a novel categorization that highlights the strategies platforms pursue to respond to competition or foster growth by using the resources and governance mechanisms at their disposal. Following prior integrative literature review in management (for example, Hoskisson & Hitt, 1990), we use an antecedent-strategy-consequence model to present the results. We go through each article manually to capture the antecedent variables and consequence variables of the platform strategies identified.

First, we group the antecedents of platform strategies based on the ecosystem dynamics. We find that various platform-, competition-, user-, and market-attributes can affect platform strategies. Figure 5 presents the antecedent-strategy model. Second, we group the consequences of the platform strategies. The grouping is based on different ecosystem matrices such as ecosystem size, quality and diversity, performance, engagement, and compliance and regulations. Figure 6 presents the strategy-consequence model. Below we highlight in detail these strategies and their interdependencies.

---INSERT FIGURES 5 and 6 ABOUT HERE---

Technology and Architecture (Box 1 of Platform Strategy in Figures 5 and 6)

Platform technology is the first significant decision a platform takes to allocate resources and design a platform ecosystem. Platform technology is the foundation of a platform and is regarded as the platform core. The modular nature of the technology allows a platform to host a large number of complementors at the periphery. Platforms make three key decisions regarding the technology and architecture – i.e., compatibility, performance, and openness. Table 4 provides a summary of the research on technology and architecture.

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Technology Compatibility. First, they decide on the compatibility and integration of the technology. The literature has looked at a platform's decision to have compatibility with the previous generations of the product. For example, Hann et al. (2016) studied the effect of intergeneration compatibility on user adoption and found that the compatibility not only helps to migrate users from the older to the newer technology but also provides a demand boost to the older technology.

A significant portion of the literature has studied a platform's compatibility with competitors. Tian et al. (2022) showed that by building a compatible technology, smaller platforms can attract complementors that also build products for larger platforms. Scholars

have also explored the factors affecting a platform's decision to build compatible technology. Adner et al. (2020) looked at the effect of the differences in the profit foci of the competing platforms and the incentives of the smaller platform to build a technology that is compatible with the technology of the larger platform. Lee and Mendelson (2007) found that early-movers and late-movers have differences in their preference for compatibility with the competitors, where the former would prefer incompatibility, and the latter would prefer compatibility. Wang et al. (2010) contrasted the inter-generation (with previous versions) and within-generation (with competitor) compatibility and found that cross-generation incompatibility decreases, but within-generation incompatibility increases a platform's likelihood of survival.

Furthermore, the technology could be compatible with non-competitor products as well, enhancing the integrability of the products and services. Wormald et al. (2023) uncovered that the platform integration profile may depend on the firm's market position and diversity before launching the platform. Kazan et al. (2018) looked at the effect of a platform's integration profile on its competitive advantage.

Technology Performance. Second, platforms make strategic decisions about the level of performance of the technology. Platforms may develop a technology that is superior to that of the competitors, or they may focus on providing a technology interface that is simpler and easier to use for the complementors. Rolland et al. (2008) found that the actions of incumbent firms making a switch to platforms and the performance of the subsequent technology architecture they develop may be driven by their digital debt and digital options. Jung et al. (2019) focused on the role of competitor platforms and the multihoming behavior of existing users and complementors on a platform's decisions to improve the platform performance.

Chen et al. (2022b) showed that platforms with superior and more complex technology might not be able to attract the complementors from the inferior preexisting platform due to

high product customization costs associated with the multihoming. Anderson et al. (2014) argued that platforms might face a trade-off between superior performance and increasing the number of complementors. They demonstrated that platforms might be better off with an inferior technology with greater availability of complementors.

Furthermore, platforms may alter the performance of the technology over time. Such technology changes may affect the complementors and their willingness to engage with the platform. Koo and Eesley (2021) showed that platform architectural changes can especially affect the performance of the smaller complementors who might not be able to adjust and update their offerings. On the other hand, Kapoor and Agarwal (2017) found that the architectural changes initiated by a platform can reduce the superiority of the complementors, making a level playing field for the complementors. Ozalp et al. (2018) found that the platforms with superior technology introductions may not only affect the competing platforms but also their own complementors (who participated in the previous generation of the platform) such that the complementors might not join the superior platform and shift their focus on the competing platforms.

Technology Openness. Finally, platforms decide on the level of the technology and architecture openness. The decisions include whether to develop web APIs (application programming interfaces) and the level of technological control to delegate to the complementors. Henderson and Clark (1990) showed that platform architecture can provide it competitive advantage, especially against incumbent players. Um et al., (2022) found that APIs can increase the product variety on the platform. Similarly, Brunswicker et al. (2019) showed that the architecture that allows moderate level of autonomy to the complementors can promote them to develop more distinctive products and reduce their uncertainty at the same time, increasing platform performance. Zhang et al. (2023) looked at the effect of complementor autonomy to use the platform technology and create their own apps on the user

engagement decisions. They find that the standardization of the modules allows the complementors to successfully attract other platform users, but the platform did not necessarily increase its usage from the users of the complementor products. Wen et al. (2022) showed that adopting a standardized as compared to a lenient technology architecture can promote complementor innovation.

Chen et al. (2021) studied platform technology governance and found that upstream platforms are more likely to adopt decentralized governance as compared to downstream platforms. Saadatmand et al. (2019) looked at the interplay between technology architecture and governance and highlighted their effect on the engagement decisions of the complementors. Boudreau (2010) found that platform openness can significantly boost the platform growth through complementors. Parker and Van Alstyne (2018) studied the effect of platform openness on a platform's decision to grant the complementors IP protection for a certain period of time on the platform growth. Niculescu et al. (2018) found that platform openness is also affected by the entry of new competition platforms such that, after entry, a platform closes its technology.

Intermediation (Box 2 of Platform Strategy in Figures 5 and 6)

A platform's principal role is to intermediate the transactions between the complementors and users. The complementors and users might face high transaction costs due to information asymmetry and uncertainty. Hence, platforms can add value by mediating the transactions and limiting any opportunistic behavior by the complementors and users. We find that platforms make strategies to improve the efficiency of finding an appropriate match, establish communication channels between complementors and users, provide information and signals about the quality of the market actors, and develop monitoring systems to help the users keep track of their purchases. Table 5 provides a summary of the research on platform intermediation.

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Search Efficiency. Platforms develop their algorithms to show the relevant set of results to the users and complementors. Platforms face a problem of "cold start," where without the data about user and complementor preferences, especially during the early stages, the search results can be highly inaccurate. While it may increase the transaction costs of the users, it may be detrimental to the complementors who rank lower in the search results. Hence, platforms add value by developing an algorithm that provides accurate results and manages the ranking order and by providing features such as sorting to allow users to find the desired results faster.

Aouad and Saban (2023) found that the efficiency of the algorithm positively affects the number of matches between the complementors and users. Mao et al. (2023) demonstrated that incorporating the user click data on a platform can significantly improve the search efficiency on the platform. However, platforms may also have incentives to develop an imperfect algorithm, especially when they charge the complementors for discoveries as compared to transactions (Kannan et al., 2022). Furthermore, Liu et al. (2023) found that the higher efficiency of the matching algorithm can provide unintended information to the complementors, especially during low-demand periods, reducing their decision to engage with the platform. Finally, Zhong (2023) showed that, at low levels of matching efficiency, improving the matching algorithm might promote competition and reduce complementor prices, while if the matching efficiency of the algorithm is high, increasing it further might prompt complementors to increase prices.

Hagiu and Wright (2024) studied the effects of platform and complementor characteristics on the platform design choice when buyers are allowed to freely search for the complementors on the platform. Kanoria and Saban (2021) showed that platforms can increase the number of transactions by allowing the shorter side to initiate contact with the

longer side but restricting the longer side. Shi (2023) demonstrated that a platform's decisions to allocate the search and contact rights to the market actors on the platform depend on the complexity of the user preferences. Immorlica et al. (2023) highlight the optimal matching design for a decentralized platform.

Liu and Cong (2023) looked at a platform's strategy to distribute the content by different creators to the platform users. They found that when platforms switched from a strategy that showed users content, they subscribed to a strategy that showed them content that their social connections liked, it increased the number of connections of the users but decreased their number of subscriptions and engagement with the content. Jung et al. (2022) looked at online dating platforms and found that the search process yields different results depending on the choice capacity (number of market actors on the other side of the platform) and the user's characteristics (male vs female).

Communication Channels. Platforms build different communication channels between the users and complementors. Platforms may allow complementors and users to communicate directly through email and telephone or may set up a dedicated messaging channel between the market actors on the platform. These facilities generally reduce the uncertainty regarding the fit between the complementors' offerings and users' needs.

Platforms may provide features that allow the market actors on one side of the platform to leave feedback and ratings for the market actors on the other side. This is especially helpful for the complementors to develop more relevant products and to guide the future decisions of the users. Thies et al. (2016) demonstrated that opinion-based and action-based social interactions between users and complementors can reduce user risks, increasing their engagement with the platform. Wang et al. (2024) proposed a recommendation system that is especially useful when the platforms showcase groups of products along with standalone product displays and showed that it can significantly increase platform revenue

and growth. Derakhshan et al. (2022) demonstrated the need for a platform strategy to use complementor information from different platforms in displaying the reviews and results to the platform users. Fradkin et al. (2021) found that when the users and complementors are only allowed to see the review after both the market actors have submitted it, they are more likely to submit the reviews, and even though the average rating is lower, the retaliation is lower as well. Malgonde et al. (2020) studied the effect of a two-sided recommender system on the matching efficiency between the complementors and users.

Furthermore, platforms may employ various strategies to nudge users to leave high-quality reviews for the complementors. Deng et al. (2022) looked at the use of editorial reviews and find that may stimulate users to not only leave a greater number of but also higher quality reviews on the platform. Fradkin and Holtz (2023) studied the use of monetary incentives to nudge users to leave reviews. They found that while such nudging might indeed encourage more users to write reviewers, the tone of such reviews is on average negative. Platforms may also develop a design in which complementors leave reviews for the users. Rifkin et al. (2023) found that such a design can cause the users to react negatively, reducing the propensity of the users to refer the platform to other users.

Platforms may also offer channels to allow price negotiations between the complementors and users. Such a communication channel can increase the sales of distinctive products on the platform (Zhao et al., 2023). Ke and Zhu (2021) looked at the effect of having a renegotiation channel on the paying preference of the users and found that it might promote low-quality users to opportunistically provide incorrect information, reducing the platform welfare.

Zeng et al. (2023) found that opening a communication channel between complementors and users that allows users to provide nudges to the complementors can increase the content created by the complementors on the platform. Gu and Zhu (2021) found

that when the trust between the complementors and users is high, providing a clear communication channel can lead to platform disintermediation.

Information and Signals. A large portion of the literature in management has focused on the platform strategy to use information and signals to orchestrate the platform ecosystem. Platforms can ask complementors and users to share particular information that reduces transaction uncertainty. Platforms themselves can also employ various reputation systems or give awards and certifications to promote a particular set of market actors.

Platforms could share information about the supplier quality as well. Rietveld et al. (2019) looked at the factors that affect a platform's decision to provide quality-related signals about a select group of complementors and demonstrated that platforms may not always promote the highest quality complementor. Agarwal et al. (2023) found that platforms are more likely to promote complementors that support network effects and are bigger. However, if the market is concentrated, the platform's likelihood of providing quality endorsement shifts from the leader towards the challenger complementor in that category. On the other hand, Hagiu and Wright (2020) showed that a platform might have incentives to orchestrate the buyers toward bigger sellers and popular products. Bimpikis et al. (2023) highlighted that platforms could maximize revenue by delaying the disclosure of quality information of the complementors. Zha et al. (2023) looked at when a platform is more likely to share information with the users and complementors. They found that when the platform acts as a marketplace as compared to a reseller of the complementor products it has higher incentives to share information with the complementors.

Hukal et al. (2020) identified the opportunity and endorsement signals provided by the platform to the complementors and showed that such signals can affect complementor engagement. Furthermore, Liang et al. (2019) observed the exposure and quality spillovers from the platform information and signals and showed how these mechanisms affect the

different sets of complementors on the platform. Shi et al. (2023) showed that partial disclosure (as compared to full disclosure) of quality information about complementors gives complementors incentives to invest in the quality of the product, leading to maximum platform revenue. Foerderer et al. (2021) focused on the quality endorsement recipients and found that the endorsement may promote the complementors to pursue the growth of the product on the same platform and also on the competitor platforms through multihoming.

Dewan et al. (2023) found that platform certification not only relocates the demand from complementors without certification to complementors who have received certification but also increases the overall demand on the platform. Jiang et al. (2023a) looked at the experience and search attributes of the information shared and found that while experience attributes increased the sales price of the complementors, search attributes did not have any significant effect.

The platform tags could have a negative effect as well. Jiang et al. (2023b) found that quality tags can increase user engagement with the complementor, due to service bottlenecks, complementors may also face negative reviews from the users. Similarly, Stouras et al. (2024) found that platform recommendations about complementors are only effective in increasing user engagement when complementors are homogenous. Li and Zhu (2021) found that increasing information transparency may allow competitor platforms to use the information to poach the complementors, increasing complementor multihoming. Sen et al. (2023) showed that when platforms remove the quality status tags, it discourages complementors from engaging with the platform, negatively affecting the platform.

Long and Liu (2023) showed that platforms may have incentives to manipulate quality signals to promote competition among complementors, that is, by increasing the attractiveness of low-quality sellers and reducing the attractiveness of high-quality sellers. In a similar study, Aziz et al. (2023) found that platforms may benefit from rating inflation due to

increased sales, however, might also face negative consequences as the increased sales would be largely driven by a small group of complementors. Chen et al. (2024) contrasted the signals sent by a complementor and a platform about a particular product or service. They found that the complementarity or substitutability of such signals depends on the capacity constraints of the products and services. Kucukgul et al. (2022) looked at the effect of a platform's decision to provide cues about the previous user's purchase decision on generating revenue.

Monitoring. Fourth, a handful of research has looked at the role of developing monitoring systems on the value created and captured in a platform ecosystem. The monitoring systems allow real-time status of the progress of the transaction. For example, strategically providing status about the transaction wait time can reduce the number of users exiting from the platform (Yu et al., 2022).

Liang et al. (2024a) focused on the application of monitoring systems to overcome the "cold start" problem faced by the algorithms and recommendation systems. They found that monitoring systems can steer the demand from the established complementors to new complementors and are also successful in increasing the overall demand on the platform. Liang et al. (2024b) found that introducing a monitoring system might encourage users to interact with complementors they might not otherwise, such as preferring international over domestic complementors. Liu et al. (2021) found that monitoring systems can successfully reduce misconduct by the complementors. For example, taxi drivers on Uber take shorter and faster routes than traditional taxi drivers. Mohlmann et al. (2021) found that increased monitoring, especially through algorithms, can negatively affect the complementor behavior and payouts.

Resources and Services (Box 3 of Platform Strategy in Figures 5 and 6)

Platforms may provide value by sharing resources and services to the complementors and users. Complementors are generally small market actors who may not have the resources

to build products or services on the platform or to satisfy the user needs and grow. Furthermore, while platforms may achieve high scale by attracting a large number of complementors, an individual complementor might be small and less powerful to extract the rents needed to survive on the platform. Hence, platforms may add value to complementors by providing them the necessary tools to scale and grow. Table 6 provides a summary of the research on platform strategies related to sharing resources and services.

---INSERT TABLE 6 ABOUT HERE---

Boundary Resources. Boundary resources are tools that platforms share with the complementors to help them integrate their products with the platform. Tan et al. (2020) highlighted that the decisions to invest in developing boundary resources have significant interdependencies on the platform pricing decisions and the availability of complementors. Karhu et al. (2018) found that platform boundary resources can help platforms attain competitive advantage against competitors. Bhargava (2022) looked at the effect of providing boundary resources on the concentration of complementors on a platform.

Ancillary Services. Recently, literature has also begun to explore the ancillary services platforms provide to the complementors. As a platform grows, it can help complementors by providing ancillary services that help them with the activities necessary to complete the transactions with the users and upgrade the products. For example, online marketplaces provide delivery services, and ride-hailing platforms provide access to maps to the complementors. Strategically providing such services to the complementors can create "lock-in" effects and promote platform growth. Chen et al. (2024) looked at platform services that complementors can integrate with their products to improve product performance. Focusing on the content creators on a social media platform, the content they create, and the quality of the platform-recommended integrations, the authors build a model that allows platforms to provide highly relevant recommendations. Basu et al. (2024) contrasted platform

strategies to provide counseling services and authentication services to improve the matching between the two sides. They found that providing counseling services might not increase platform revenue and, depending on the platform's capabilities to provide such services, they may be complements or substitutes to the authentication services. On the other hand, Li et al. (2023) found that such services may decrease the marginal returns of the complementors from their in-house investments and might discourage them from scaling.

Protection Services. Finally, platforms can also decrease the uncertainty of the users by providing assurance services such as buyer protection clauses and allowing refunds. Luo et al. (2018) find that buyer protection can increase the number of purchases by buyers. Barach et al. (2020) demonstrated that buyer protection services could be used as a mechanism to signal the quality of the complementors. While providing buyer protection did not increase the overall sales, it stimulated the users from a complementor not providing buyer protection services to the complementors providing buyer protection services. Nan et al. (2019) demonstrated the strategic trade-offs related to a platform's decision to provide protection services. Specifically, while such services may increase the number of transactions, they may increase the costs due to an increased level of inconvenience. Furthermore, platforms may also have incentives to make these policies mandatory. Zheng et al. (2023) found that by adopting such a policy, platforms might successfully remove low-quality complementors from the platform and replace them with high-quality complementors, increasing the platform revenue in the long run.

Kwan et al. (2023) looked at the platform decision to form a jury to resolve the dispute and highlighted that there is juror bias in favor of the same side market actors, but it reduces with experience. On the other hand, dispute resolution mechanisms could be misused to gain leverage on the cross-side market actors, such as through blackmail. Papanastasiou et al. (2023) demonstrated that platforms can minimize such value-reducing behavior by

decentralizing the dispute resolution mechanisms – i.e., by giving the market actors the power to delete such comments and reviews. Kozinets et al. (2021) looked at a platform's decision to provide tools that empower users and found that such decisions significantly affected the presence of network effects.

Complementor and User Engagement (Box 4 of Platform Strategy in Figures 5 and 6)

Platforms can increase the overall value of the ecosystem by increasing the engagement of the complementors and users with the platform. Furthermore, platforms also play a regulatory role on a platform to govern the behavior of users and complementors (Parker et al., 2017; Teh, 2022). We find that the platform strategies to govern the engagement of the market actors can be grouped into gamification, community building, autonomy, gatekeeping, and rules and regulations.

Gamification. First, platforms employ mechanisms that enhance the interest or willingness of the market actors to engage with the platform. Gamification includes the addictiveness, UI (user interface) design, and games that increase the appeal and usability of the platform. Platforms face strategic tradeoffs in building such mechanisms. For example, while increasing the addictiveness of the platform can increase the marginal utility of the users to engage with the platform, it overall disincentivizes a greater number of users to join the platform (Ichihashi & Kim, 2023).

Community Building. Second, platforms can add value by building a sense of community around the market actors. For example, crowdfunding platforms host webinars and workshops to increase the connectedness between the startups that have successfully fundraised on the platform. Furthermore, complementors on a platform may feel demotivated due to the lack of organizational identity. Ai et al. (2023) showed that a platform's decision to encourage teams amongst complementors can indeed increase their engagement with the platform. Beck et al. (2023) found that community building can reduce fake reviews,

increasing user trust in the platform. Furthermore, platforms can also participate in the communication channels, for example, by providing answers to the technical questions published on the discussion boards. Huang et al. (2018) found that such platform involvement can lead to higher contributions by users.

Autonomy. Third, platforms decide on the level of dependency and autonomy complementors have on the platform ecosystem. Engagement autonomy is distinct from technology autonomy in that while the latter governs the rules of how complementors can use and deploy the platform technology, the former is concerned with the complementor's behavior and decision rights on the platform. Platforms can have a decentralized governance style, or a design controlled by the platform owner. Tiwana (2015) highlighted that when platforms confer complementor autonomy by giving them decision rights, they retain a greater number of complementors, i.e., reduce complementor exit from the platform. However, conferring autonomy can lead to coordination issues between the platform and the complementors (Leong et al., 2018). Rahman et al. (2023) showed that platform experimentation to decrease complementor autonomy might be successful, especially in the later stages of the platform.

Gatekeeping. Fourth, platforms also act as gatekeepers and restrict the entry of the complementors and users that do not meet the set requirements. These requirements could be set by the platform to self-regulate or by the government. Tiwana (2015) showed that platform input control can affect the performance of the product and its future updates. Huang et al. (2022) found that platform gatekeeping based on the quality of the complementors can improve platform growth and welfare. Miremadi et al. (2023) demonstrated that opening a platform can increase generativity, positively affecting platform adoption. O'Mahony and Karp (2022) looked at the interplay between platform gatekeeping and leadership and found that relaxed gatekeeping increases complementor entry, and unclear leadership decreases

complementor entry. Han et al. (2022) showed that by implementing platform gatekeeping that reduces access to low-quality complementors, platforms can reduce the negative societal consequences of the platform such as crimes. Chung et al. (2023) found that when a platform imposes high gatekeeping standards, it affects the complementors not only on the focal platform but also on the competitor platform. Specifically, it makes it harder for the complementors to achieve economies of scale, prompting them to leave both platforms.

On the other hand, Zhang et al. (2022) found that relaxing platform gatekeeping might reduce complementor knowledge sharing. Song et al. (2021) found that platform openness could affect the complementor decisions to sell on the platform. Geva et al. (2019) observed that following an increase in low-quality complementors, the sales of an average complementor decrease on a platform. This suggests that low-quality complementors might not only fail to stimulate the market but also cause negative network externalities.

Rules and Regulations. Finally, platforms may set rules and regulations regarding the behaviors of the complementors and users and the nature of the transactions. Platforms can restrict the number of transactions, transaction duration limits, and allocate decision rules. Platforms may also set punishments regarding the behaviors that break such rules and regulations. Such decision rules are important for a platform to transition from the introductory to the scaling stage. Huber et al. (2022) found that the rules and regulations are more effective when they are more sensitive to the ecosystem-wide values. Koo (2024) contrasted the platform strategies to communicate rules with and without linking them to the government regulations and find that complementors were significantly less likely to behave opportunistically when the platform rules were communicated along with the government laws. Hsieh and Vergne (2023) found that rules and regulations are significantly important in a decentralized platform to stimulate growth.

Chen et al. (2023) found that post-bug discovery a platform's response to the bug, i.e., the degree of the punishment to the rule-breakers, is significantly more important than the bug itself for the user engagement decision. Pu et al. (2022) contrasted the effect of platform punishment for quality misrepresentation and return policy on the complementor's incentives to send false quality signals. They found that platform punishment may be double-edged sword. While it may deter high-quality complementors from misrepresenting their quality, it increases the incentives for low-quality complementors to exaggerate their quality. Furthermore, they showed that the return policy strategy dominates platform punishment.

DISCUSSION

Platforms are meta organizations that build the platform technology and orchestrate the behavior of the market actors. Platforms can use various strategies to gain a competitive advantage and grow the ecosystem. We build a semi-systematic literature review intending to guide future research by highlighting (1) platform strategies, and (2) the antecedents and consequences of such strategies.

Platform strategy is defined as the decision taken by a platform to design, govern, and grow the platform ecosystem (Tiwana, 2013). Platform ecosystems, at their core, nurture strong network effects such that complementors increase the overall utility users drive from consuming on the platform, and users increase the overall utility complementors drive from selling on the platform (McIntyre and Srinivasan, 2017). However, when a platform ecosystem is in its early stage, the platform owners face a chicken-and-egg problem: the utility of both complementors and users to participate in a platform ecosystem without any additional incentives is quite low (Murthy & Madhok, 2021). In such circumstances, attracting complementors and users becomes even more critical for the growth of the platform ecosystem. However, the literature on how platform strategies affect the behavior of complementors and users on the platform is still isolated and lacks an integrative view.

A review of extant research on platform strategy is needed for multiple reasons. First, given that prior literature reviews have focused predominantly on explaining the concepts such as network effects (McIntyre & Srinivasan, 2017) and competition (Rietveld & Schilling, 2022) and the reviews on platform strategy such as platform entry into complementor space (Zhu, 2019) and governance mechanisms (Chen et al., 2023) have been systematic in nature, the literature still lacks an empirical integration of literature on platform strategy and growth (Cenamor, 2021). Furthermore, through our "bottoms up" approach, we uncover novel categories of platform strategy that have not been identified by previous literature reviews such as platform intermediation strategy that explains, for instance, platform strategy to develop communication channels between complementors and users. Another example of novel category is gamification, where platforms decide on the level of addictiveness of a platform which might increase the utility of a user on a platform but might also reduce the utility of a greater number of new users in joining the platform. For example, social media platforms like Facebook and TikTok face challenges in optimizing the screen usage of the heterogeneous set of users.

Second, platform ecosystems have been studied from a variety of angles by academics in fields including IS, management, and marketing (Rietveld & Shilling, 2021). However, the literature has mostly developed in isolation in these fields. An apparent consequence of this lack of cross-field fertilization is the slow adoption of common terms to represent the platform owners and the market actors on the platform. For example, the market actors on the supply side of the platform (that we refer to as complementors) are usually referred to by their context-specific terminologies, such as sellers, hosts, and developers (Gawer & Cusumano, 2014).

We integrate the literature on platform strategy from various fields into common umbrella concepts and highlight the interdependencies of these strategies. We aim to guide

the future research on a particular topic in platform strategy to 1) relevant articles in the adjacent fields of work, and 2) consider strategic tradeoffs in pursuing platform growth through these strategies and establish the boundary conditions of analyzed relationships. For example, a fruitful area of research on platform strategy across fields has been platform information and signals such as through awards and certifications. While Hagiu and Wright (2020) found that platforms have incentives to promote the popular products on the platform, Rietveld et al. (2019) and Agarwal et al. (2023) showed that platforms may not always promote the leaders in the category and might favor the challengers. It might benefit scholars and managers alike to consider these findings in conjunction than in isolation.

Second, the literature in management has recognized the inherent strategic tradeoffs in platform decision-making (Karhu et al., 2024). Reconciliation of the literature from different fields will help guide our understanding of such strategic tradeoffs and develop a common theory of platforms. For example, one of the largest areas of research on the topic has been platform strategy to intermediate the relationships between complementors and users. As noted in table 4, platforms make strategic decisions regarding the search rights on the platform. That is, while the primary objective of a platform as an intermediary is to reduce the information asymmetries between the complementors and users (Basu et al., 2024), research suggests that are advantages for building some degree of asymmetry and platforms may allocate search and contact rights accordingly (Yu & Zhang, 2024). A notable example is the dating platform Bumble's decision to allow women to initiate the contact, in contrast to Match.com, where both men and women can initiate contact (Kanoria & Saban, 2021). This strategy gave Bumble a competitive edge to capture a fair share of the market.

Contributions to the Literature on Platforms Ecosystems

The study offers several findings to contribute to our knowledge on this so-far understudied aspect of platforms, i.e., the relationship between platform strategy and growth.

The importance of comprehending how platforms make decisions regarding their value creation strategies – i.e., technology, intermediation, resources and services, and engagement – is central to building a comprehensive understanding of a platform ecosystem. That is, these decisions have profound implications not only for the platform growth but also on the growth of the complementors and the welfare of the users. Researchers are increasingly recognizing that understanding the dynamics of platform strategies and the inherent strategic tradeoffs is crucial for creating effective policies, fostering innovation, and ensuring the long-term viability of platform ecosystems (Carst & Hu, 2023).

Our theoretical model presented in Figures 5 and 6 is not exhaustive but rather meant as a multilevel lens and guiding framework to which other strategies and variables can be added in the future. It provides an integrative view for understanding the vast and diverse body of literature on platform because it subsumes all levels of analyses, theoretical frameworks, and disciplinary idiosyncrasies so typical of this novel and still emergent literature. We posit that such an integration can serve as a building block to guide future research on platform strategies in a more systematic fashion. Our theoretical framework identifies a large number of general arguments and underserved areas, from which we hope future scholars will derive testable hypotheses.

Avenues for Future Research

We offer several avenues of future research. First, while existing studies have explored platform strategies in diverse contexts (Rietveld & Shilling, 2021), future research can deepen our understanding by examining platforms across different industries, geographic locations, and technological landscapes and how such environmental factors affect platform strategy.

Second, there are strategic choices that the platform can make regarding certain decisions such as technology openness vs governance openness and in-house ancillary

services vs partnerships. Future research can extend our knowledge of the interdependencies between such relationships and highlight the factors that promote a particular choice over the other.

Third, the dynamic nature of platforms and their potential for disruption has spurred investigations into environmental elements impacting platforms' and complementors' incentives for value creation. This domain encompasses an expansive spectrum of factors, encompassing regulatory frameworks, government interventions, and market dynamics, including competitive and economic influences.

Yet our literature review reveals that little is still known about these environmental factors and how they influence platform strategy. For example, studying how contextual variations influence platform strategies will contribute to a more comprehensive and nuanced comprehension of platform ecosystems. One fruitful context to examine is Europe with the recent approval of the European Directive on platforms. In October and November 2022, the European Parliament and the Council agreed on a comprehensive package of legislation establishing new rules for online platforms. With respect to complementors, the Digital Markets Act (DMA) will be especially consequential, as it supplements competition law and limits the power of large digital companies. The DMA establishes obligations for so-called gatekeepers to comply with in their daily operations, for example about business users to promote their offer and conclude contracts with their customers outside the gatekeeper's platform.

CONCLUSION

In conclusion, this semi-systematic literature review synthesizes and analyzes a diverse body of research across information systems, management, and marketing domains to offer a comprehensive understanding of platform strategy. Our review points out and discusses the strategic tradeoffs inherent in platform growth. The nuanced exploration of

platform technology, intermediation, resources and services, and engagement decisions contributes to a refined understanding of platform strategy and value creation. The identified gaps underscore the need for future research to delve into the underexplored areas of research and highlight the interactions and interdependencies in platform strategic decisions. This review aims to serve as a foundation for scholars, policymakers, and practitioners, fostering interdisciplinary dialogue and inspiring future inquiries into the multifaceted realm of platform strategy and growth.

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TABLES AND FIGURES

Figure 1. Evolution of the analyzed FT50 articles on platform strategy by journal field.

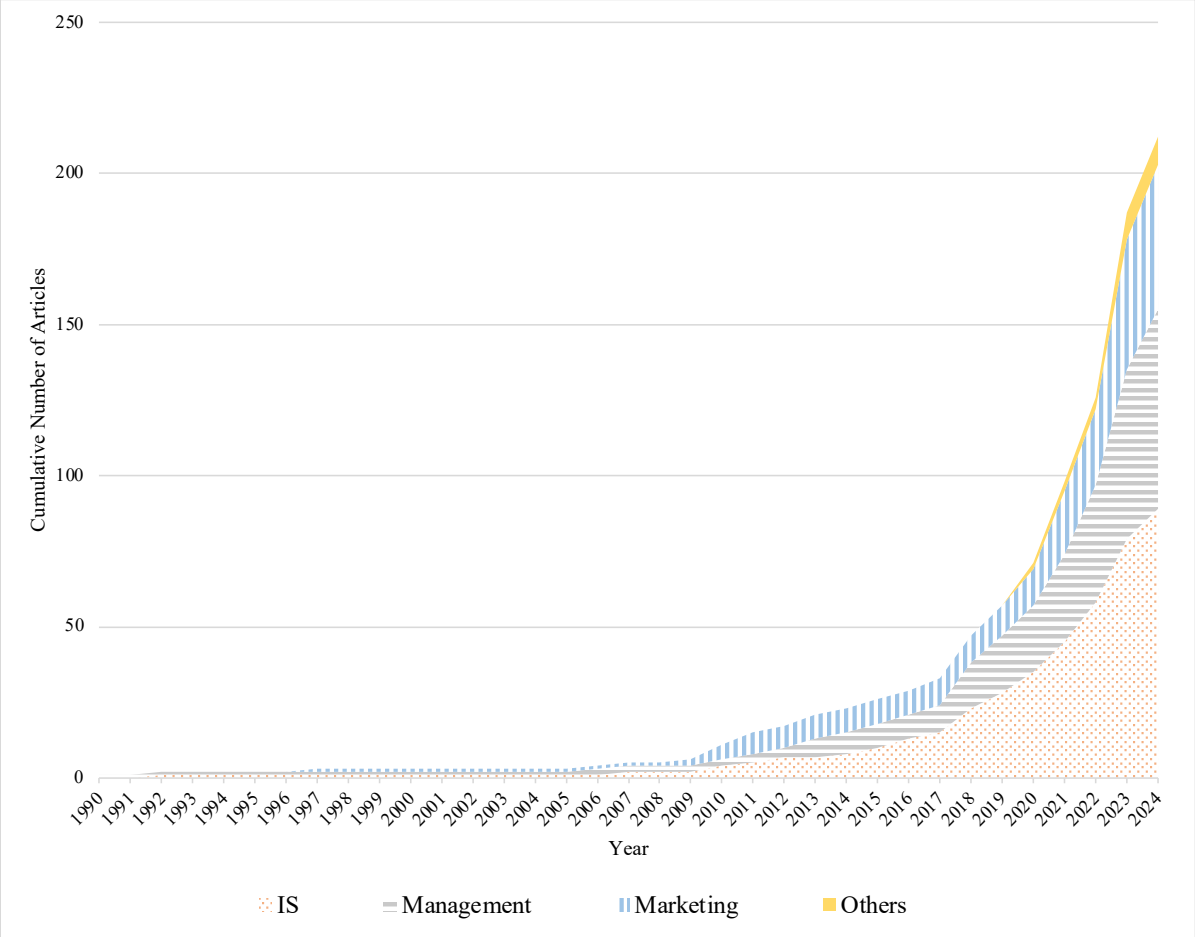
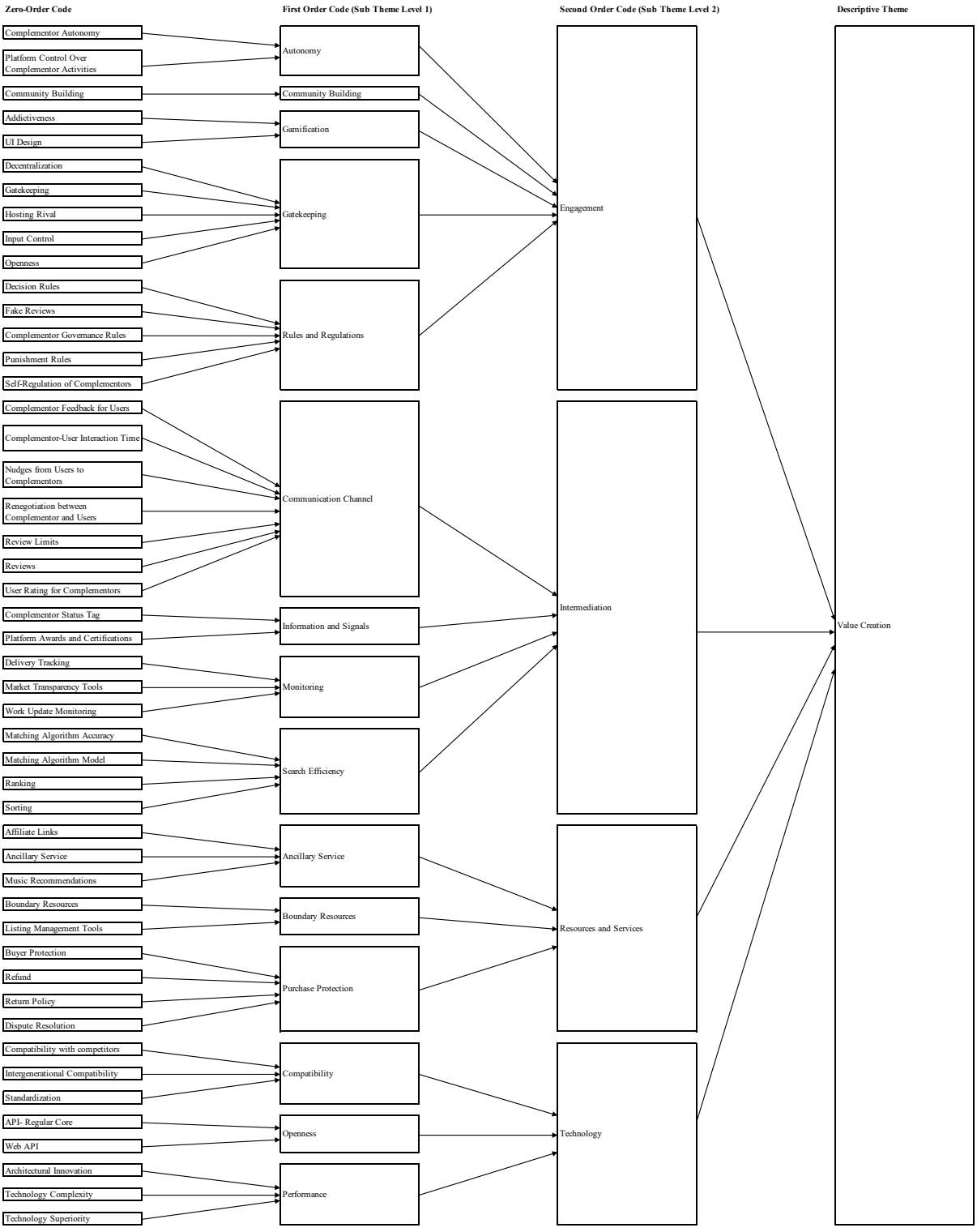
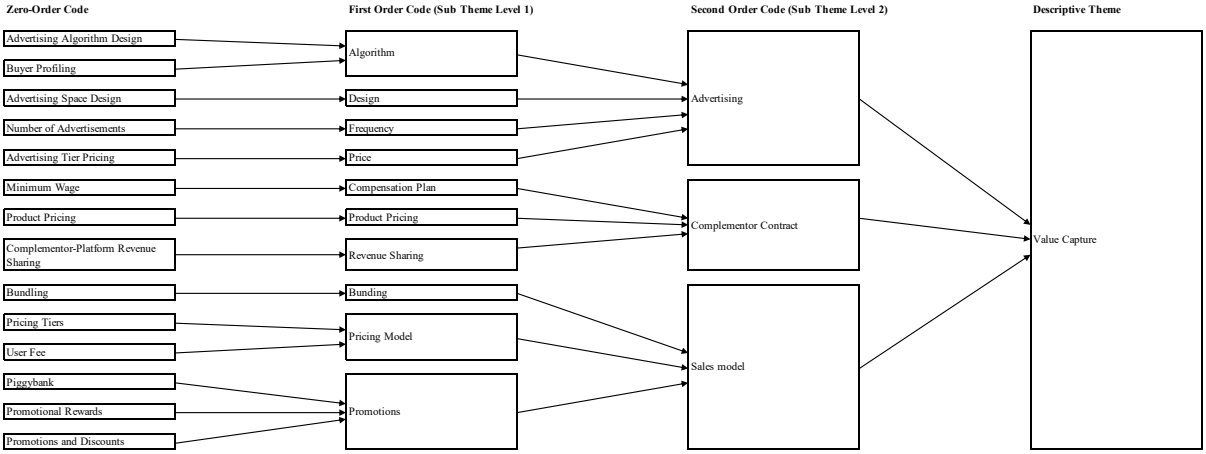


Figure 2. Codes and themes developed on platform strategy using thematic analysis.




Zero-Order Code
First Order Code (Sub Theme Level 1)
Second Order Code (Sub Theme Level 2)
Descriptive Theme
Advertising Algorithm Design
Buyer Profiling
Advertising Space Design
Number of Advertisements
Advertising Tier Pricing
Minimum Wage
Product Pricing
Complementor-Platform Revenue Sharing
Bundling
Pricing Tiers
User Fee
Piggybank
Promotional Rewards
Promotions and Discounts
Algorithm
Design
Frequency
Price
Compensation Plan
Product Pricing
Revenue Sharing
Bunding
Pricing Model
Promotions
Advertising
Complementor Contract
Sales model
Value Capture

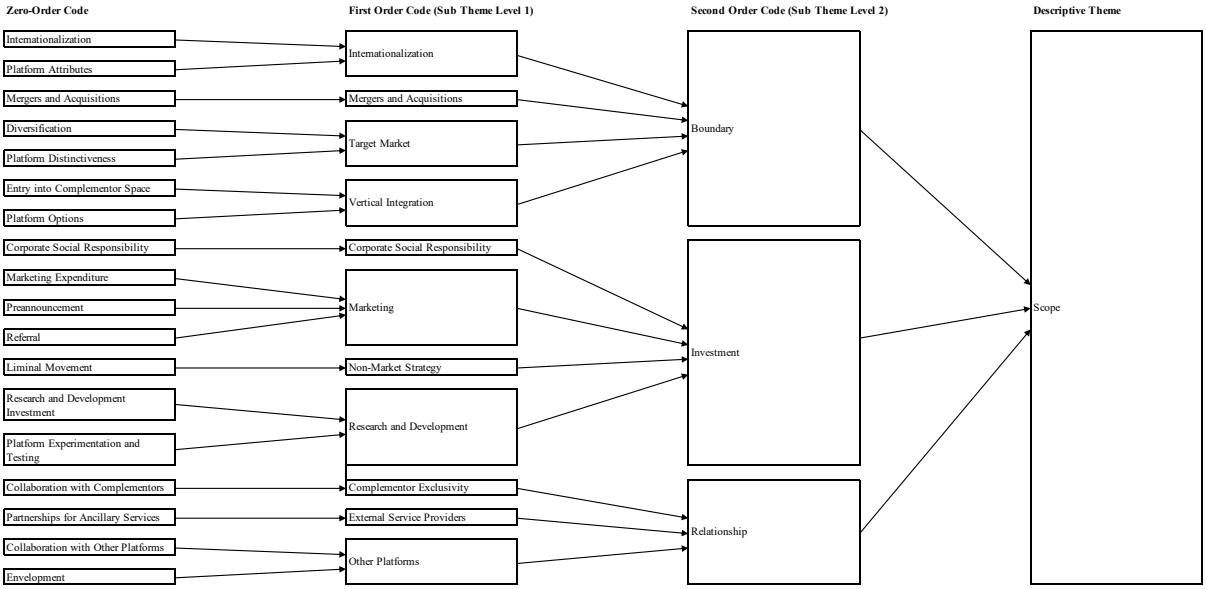

Zero-Order Code
First Order Code (Sub Theme Level 1)
Second Order Code (Sub Theme Level 2)
Descriptive Theme
Internationalization
Platform Attributes
Mergers and Acquisitions
Diversification
Platform Distinctiveness
Entry into Complementor Space
Platform Options
Corporate Social Responsibility
Marketing Expenditure
Preannouncement
Referral
Liminal Movement
Research and Development Investment
Platform Experimentation and Testing
Collaboration with Complementors
Partnerships for Ancillary Services
Collaboration with Other Platforms
Envelopment
Internationalization
Mergers and Acquisitions
Target Market
Vertical Integration
Corporate Social Responsibility
Marketing
Non-Market Strategy
Research and Development
Complementor Exclusivity
External Service Providers
Other Platforms
Boundary
Investment
Relationship
Scope

Table 1. Distribution of the analyzed articles based on journals (FT50) and strategy.

Field	Journal	Value Creation	Value Capturing	Scope	Total (Journal)	Total (Field)
IS	Information Systems Research	30	7	6	43	89
	Journal of Management Information Systems	8	4	1	13	
	Management Science - IS	13	4	3	13	
	MIS Quarterly	9	1	3	20	
Management	Academy of Management Journal	2	-	-	2	66
	Administrative Science Quarterly	1	-	-	1	
	Journal of Business Venturing	1	-	1	2	
	Journal of International Business Studies	-	-	4	4	
	Journal of Management	4	-	4	8	
	Journal of Management Studies	2	1	2	5	
	Management Science - STR	5	3	4	12	
	Organization Science	2	-	1	3	
	Research Policy	5	-	4	9	
	Strategic Entrepreneurship Journal	-	-	1	1	
	Strategic Management Journal	6	2	11	19	
Marketing	Journal of Consumer Research	2	-	-	2	48
	Journal of Marketing	2	1	1	4	
	Journal of Marketing Research	2	2	4	8	
	Journal of the Academy of Marketing Science	-	1	-	1	
	Management Science - MKT	8	10	1	19	
	Marketing Science	7	5	2	14	
Others	Management Science - OPS	6	2	-	8	9
	Management Science - SMS	1	-	-	1	

Figure 3. Distribution of the analyzed FT50 articles based on platform strategy and journal field.

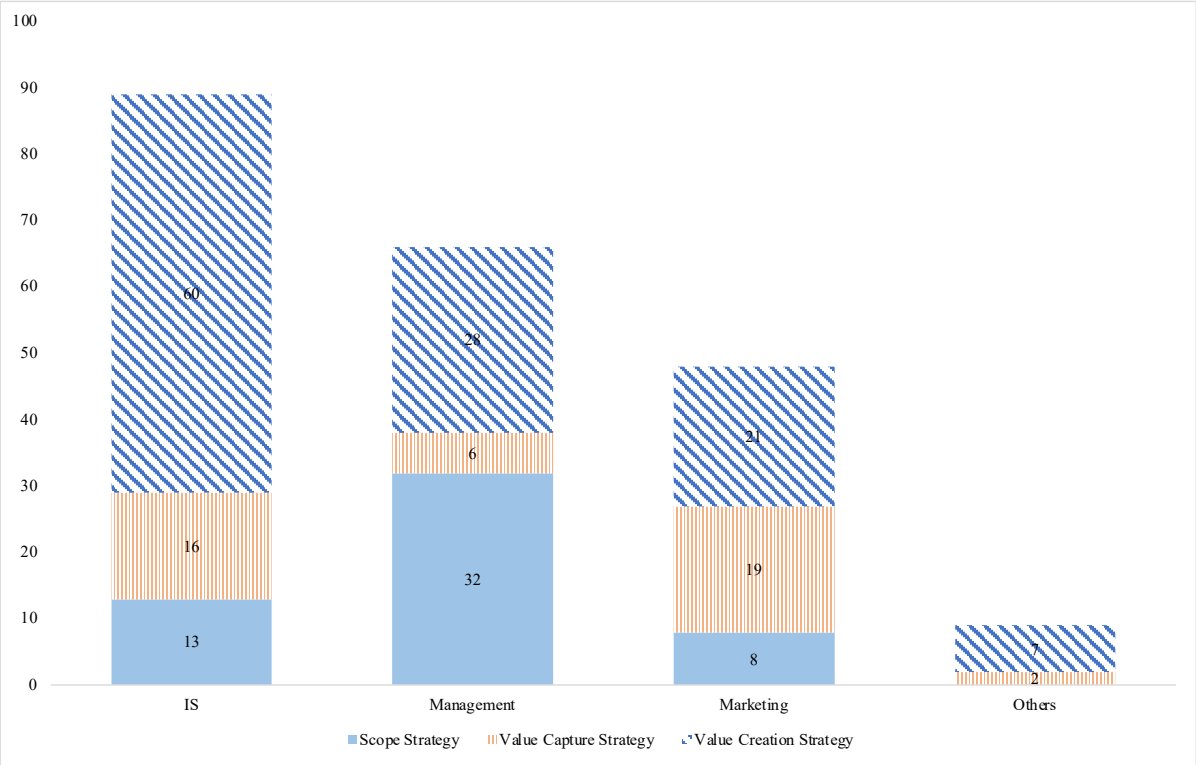


Table 2. Distribution of the analyzed FT50 articles by field and research methodology on platform value creation strategies

Research Methodology	IS	Management	Marketing	Others
Case Study	3	-	-	-
Empirical	24	14	5	-
Empirical - Field Experiment	8	-	4	3
Experiment	-	1	2	-
Mixed Methods	1	1	-	-
Modeling	22	4	9	4
Qualitative	2	7	1	-
Theoretical	-	1	-	-

Figure 4. Evolution of the analyzed FT50 articles on platform value creation strategy by journal field.

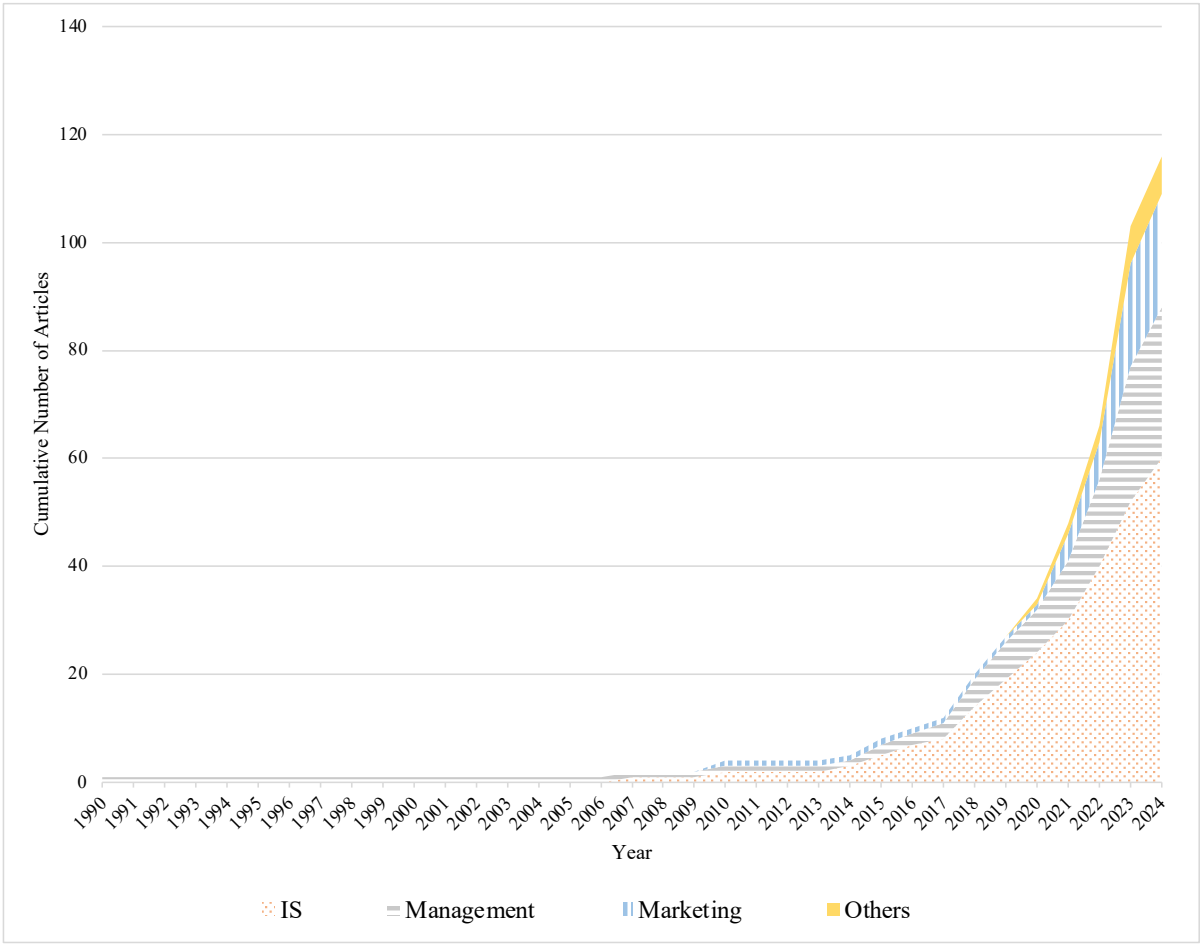


Figure 5. Antecedents of platform value creation strategy.

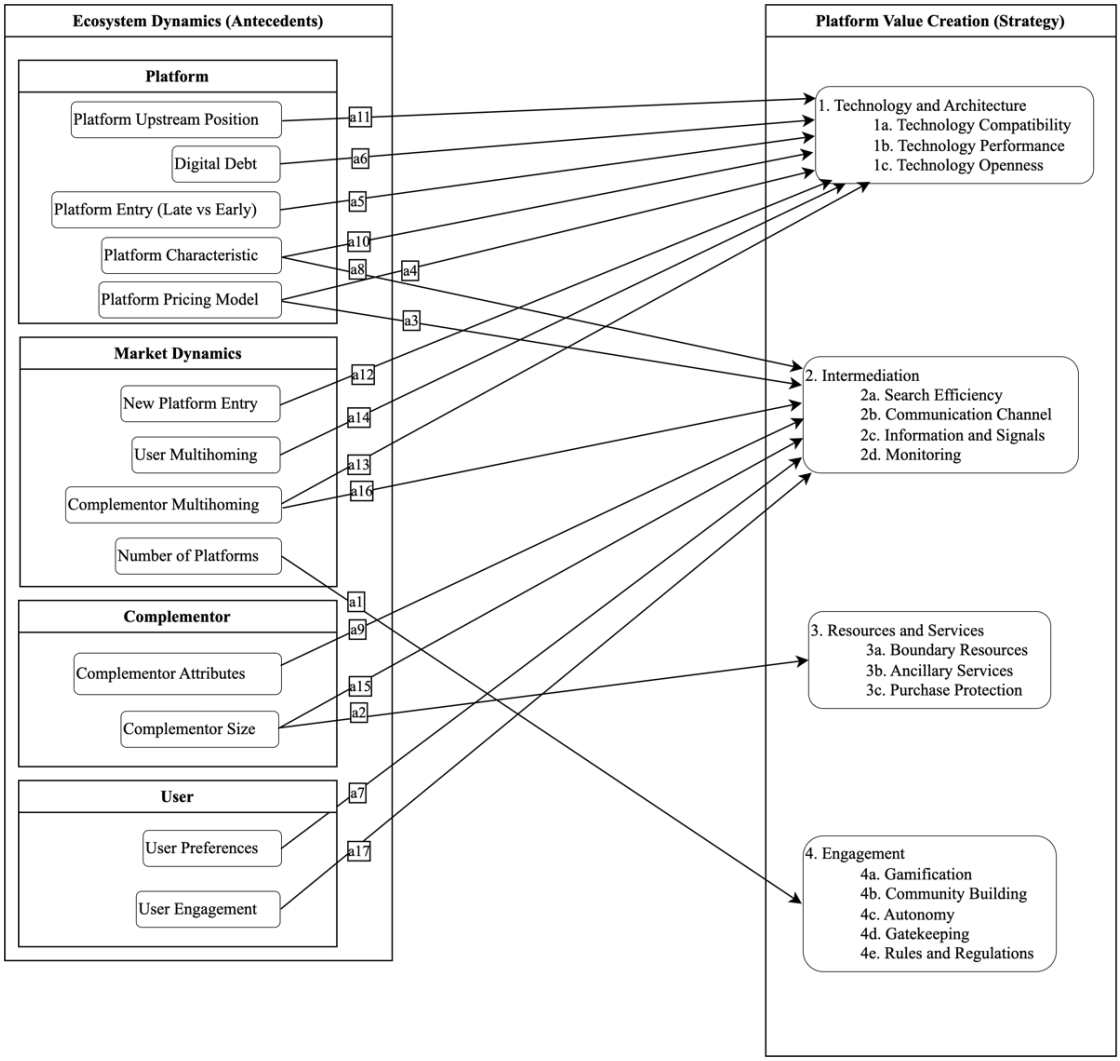


Figure 6. Consequences of platform value creation strategy.

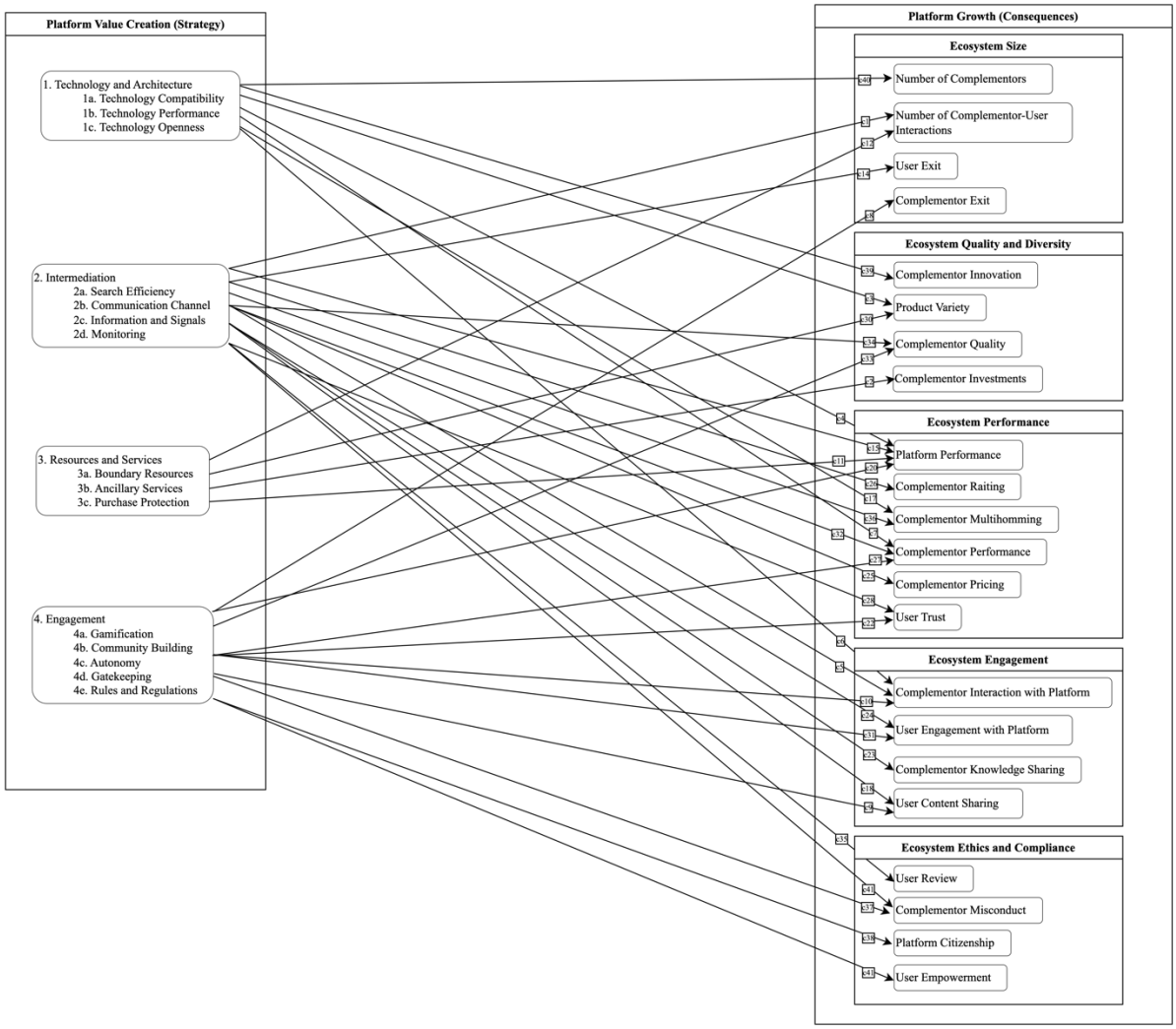


Table 3. Summary of research on platform technology.

Platform Strategy	Notable Tradeoffs	Major Decisions	Examples	Articles
Technology Compatibility	• Compatibility vs Distinctiveness • Compatibility vs Innovation	• Intergeneration compatibility	• Sony launching gaming console and the compatibility of the existing video games.	• Hann et al. (2016) • Wang et al. (2010)
		• Within generation compatibility	• Samsung launching new mobile phone with a standard USB type-c port	• Tian et al. (2022) • Adner et al. (2020) • Lee and Mendelson (2007)
		• Integrability with non-competing products	• Apple integrating its products to create an ecosystem	• Wormald et al. (2023) • Kazan et al. (2018)
Technology Performance	• Superior Performance vs Complementor Costs	• Degree of Performance	• Microsoft launching Windows updates and the availability of high-performance chips for PC manufactures.	• Rolland et al. (2008) • Jung et al. (2019) • Chen et al. (2022b) • Anderson et al. (2014) • Koo and Eesley (2021) • Kapoor and Agarwal (2017) • Ozalp et al. (2018)
Technology Openness	• Complementor Standardization vs Autonomy • Content Installed Base vs Content Quality	• Degree of Modularity	• Apple vs Android platform terms and conditions to publish and update apps	• Henderson and Clark (1990) • Um et al., (2022) • Brunswicker et al. (2019) • Zhang et al. (2023) • Wen et al. (2022)
		• Technology Decentralization	• Wikipedia vs Britannica	• Chen et al. (2021) • Saadatmand et al. (2019) • Boudreau (2010) • Parker and Van Alstyne (2018) • Niculescu et al. (2018)

Table 4. Summary of research on platform intermediation.

Platform Strategy	Notable Tradeoffs	Major Decisions	Examples	Articles
Search Efficiency	• Quality vs Revenue	• Algorithm	• Organic results list on Apple App Store	• Aouad and Saban (2023) • Mao et al. (2023) • Kannan et al. (2022) • Liu et al. (2023) • Zhong (2023)
		• Contact Rights	• Bumble's decision to allow women to contact first and restrict men.	• Hagiu and Wright (2024) • Kanoria and Saban (2021) • Shi (2023) • Immorlica et al. (2023)
		• Content Filtering	• Amazon allowing users to filter their search results	• Liu and Cong (2023) • Jung et al. (2022)
Communication Channel	• Facilitate transactions vs disintermediation risk	• Reviews and Feedback	• Google Maps allows users to leave star ratings and reviews.	• Thies et al. (2016) • Wang et al. (2024) • Derakhshan et al. (2022) • Fradkin et al. (2021) • Deng et al. (2022) • Fradkin and Holtz (2023) • Rifkin et al. (2023) • Malgonde et al. (2020)
		• Price Negotiation	• Idealista allows users to offer alternative rental price to the property owners.	• Zhao et al. (2023) • Ke and Zhu (2021)
		• Direct Communication	• Facebook allows users to list their email ids or contact numbers.	• Zeng et al. (2023) • Gu and Zhu (2021)
Information and Signals	• Number of Transactions vs Multihoming • Transparency vs User Privacy • Visibility vs Competition	• Complementor Quality Tag	• Amazon provides "Amazon's Choice" badge to the products	• Rietveld et al. (2019) • Agarwal et al. (2023) • Hagiu and Wright (2020) • Bimpikis et al. (2023) • Zha et al. (2023) • Hukal et al. (2020) • Liang et al. (2019)

				• Shi et al. (2023) • Foerderer et al. (2021) • Dewan et al. (2023) • Jiang et al. (2023a) • Jiang et al. (2023b) • Stouras et al. (2024) • Li and Zhu (2021) • Sen et al. (2023)
		• Distorted Signals	• Uber limits the information shared with drivers about passengers to limit "cherry picking"	• Long and Liu (2023) • Aziz et al. (2023) • Chen et al. (2024) • Kucukgul et al. (2022)
Monitoring	• Transparency vs User Deterrence • Transparency vs Uncertainty Costs	• Wait Time (Before Transaction)	• Zocdoc shows wait time for a virtual consultation	• Yu et al. (2022)
		• Work Progress (After Transaction)	• Uber Eats provides delivery tracking services.	• Liang et al. (2024a) • Liang et al. (2024b) • Liu et al. (2021) • Mohlmann et al. (2021)

Table 5. Summary of research on platform resources and services.

Platform Strategy	Notable Tradeoffs	Major Decisions	Examples	Articles
Boundary Resources	• Complexity vs Standardization	• Developing Boundary Services	• YouTube provides ad management tools to help complementors monetize their content.	• Tan et al. (2020) • Karhu et al. (2018) • Bhargava (2022)
Ancillary Services	• Value vs Costs	• Developing Ancillary Services	• Uber provides drivers access their mapping services.	• Chen et al. (2024) • Basu et al. (2024) • Li et al. (2023)
Purchase Protection Services	• Number of Transactions vs Costs • Power vs Misconduct	• Refunds	• Amazon Prime provides free returns with full refund for the products purchased on the platform.	• Luo et al. (2018) • Barach et al. (2020) • Nan et al. (2019) • Zheng et al. (2023)
		• Dispute Resolution	• Alibaba allows users to open a dispute with a seller for a good purchased.	• Kwan et al. (2023) • Papanastasiou et al. (2023) • Kozinets et al. (2021)

Table 6. Summary of research on platform strategies to govern complementor and user engagement.

Platform Strategy	Notable Tradeoffs	Major Decisions	Examples	Articles
Gamification	• Quantity vs Engagement	• Level of Addictiveness	• Facebook allows users to like photos of each other increasing their engagement	• Ichihashi and Kim (2023)
Community Building	• Motivation vs Collation	• Team Building and Networking	• Apple hosts WWDC (worldwide developer community) event for the developers	• Ai et al. (2023) • Beck et al. (2023)
		• Discussion Board	• Crowdcube allows investors of a particular startup to ask questions, and share opinions	• Huang et al. (2018)
Autonomy	• Value vs Coordination Costs	• Decision Rights	• Apple governs the way developers accept and receive payments on the platform.	• Tiwana (2015) • Leong et al. (2018) • Rahman et al. (2023)
Gatekeeping	• Number vs Quality of market actors	• Input Control	• Republic screens and gives permission to select crowdfunding campaigns that meet the conditions	• Tiwana (2015) • Huang et al. (2022) • Miremadi et al. (2023) • O'Mahony and Karp (2022) • Han et al. (2022) • Chung et al. (2023) • Zhang et al. (2022) • Song et al. (2021) • Geva et al. (2019)
Rules and Regulations	• Autonomy vs Misconduct	• Rule Coherence	• Airbnb requires host to meet the safety standards as set by the government	• Huber et al. (2022) • Koo (2024) • Hsieh and Vergne (2023)
		• Punishment	• Facebook actively punishes and restricts the profiles that violate its rules	• Chen et al. (2023) • Pu et al. (2022)

APPENDIX FOR CHAPTER 1

Table 1. Advancement from the existing literature reviews

Journal Domain	Article	Focus	Advancement
Management	McIntyre and Srinivasan (2017)	Network Effects	We build on the descriptive findings of the paper on platform resources to present an integrated view of the literature on platform strategy.
	Zhu (2019)	Platform Entry into Complementor Space	We expand the empirical analysis to all strategic decisions taken by a platform, including platform entry into complementor space.
	Rietveld and Schilling (2021)	Platform Competition	We follow Rietveld and Schilling (2021) closely in our sample collection. We differ in terms of our focus on platform strategic decisions, including platform technology and design features, as opposed to platform competition.
	Chen et al. (2022)	Platform Governance	We present a finer grained classification of platform strategy and brings together the literature on the topics to highlight their interdependencies.
IS	Li and Kettinger (2021)	Platform Capabilities	We follow Li and Kettinger (2020) in building an integrative view of the literature. We also identify the variables in the articles in our sample but differ in selecting studies that specifically study platform decision making as compared to platform capabilities.

Table 2. List of all articles in our final sample.

Index	Journal	Journal Field	Citation	Year	Research Methodology	Link
1	Management Science	IS	Adner, R., Chen, J. Q., & Zhu, F. (2020). Frenemies in platform markets: Heterogeneous profit foci as drivers of compatibility decisions. *Management Science - IS*, 66(6), 2432-2451.	2020	Modeling	a4
2	Strategic Management Journal	Management	Agarwal, S., Miller, C. D., & Ganco, M. (2023). Growing platforms within platforms: How platforms manage the adoption of complementor products in the presence of network effects? *Strategic Management Journal*, 44(8), 1879-1910.	2023	Empirical	a15
3	Management Science	Marketing	Ai, W., Chen, Y., Mei, Q. Z., Ye, J. P., & Zhang, L. Y. (2023). Putting teams into the gig economy: A field experiment at a ride-sharing platform. *Management Science - MKT*, 69(9), 5336-5353.	2023	Empirical - Field Experiment	c16
4	Information Systems Research	IS	Anderson, E. G., Parker, G. G., & Tan, B. (2014). Platform performance investment in the presence of network externalities. *Information Systems Research*, 25(1), 152-172.	2014	Empirical	c29
5	Management Science	Marketing	Aouad, A., & Saban, D. (2023). Online assortment optimization for two-sided matching platforms. *Management Science - MKT*, 69(4), 2069-2087.	2023	Modeling	c1
6	Information Systems Research	IS	Aziz, A., Li, H., & Telang, R. (2023). The consequences of rating inflation on platforms: Evidence from a quasi-experiment. *Information Systems Research*, 34(2), 590-608.	2023	Empirical - Field Experiment	c32
7	Management Science	IS	Barach, M. A., Golden, J. M., & Horton, J. J. (2020). Steering in online markets: The role of platform incentives and credibility. *Management Science - IS*, 66(9), 4047-4070.	2020	Empirical - Field Experiment	c12
8	Management Science	IS	Basu, A., Bhaskaran, S., & Mukherjee, R. (2024). Compatibility and information asymmetry in online matching platforms. *Management Science - IS, in press*.	2024	Modeling	c11
9	Journal of Marketing Research	Marketing	Beck, B. B., Wuyts, S., & Jap, S. (2023). Guardians of trust: How review platforms can fight fakery and build consumer trust. *Journal of Marketing Research*, 61(4), 682-699.	2023	Experiment	c22

10	Management Science	Others	Belavina, E., Marinesi, S., & Tsoukalas, G. (2020). Rethinking crowdfunding platform design: Mechanisms to deter misconduct and improve efficiency. *Management Science - Ops*, 66(11), 4980-4997.	2020	Modeling	c30
11	Management Science	IS	Bhargava, H. K. (2022). The creator economy: Managing ecosystem supply, revenue sharing, and platform design. *Management Science - IS*, 68(7), 5233-5251.	2022	Modeling	c30
12	Management Science	Others	Bimpikis, K., Papanastasiou, Y., & Zhang, W. (2023). Information provision in two-sided platforms: Optimizing for supply. *Management Science*, 70(7), 4533-4547.	2023	Modeling	c15
13	Management Science	IS	Boudreau, K. (2010). Open platform strategies and innovation: granting access vs. devolving control. *Management Science - IS*, 56(10), 1849-1872.	2010	Empirical	c29
14	MIS Quarterly	IS	Brunswicker, S., Almirall, E., & Majchrzak, A. (2019). Optimizing and satisficing: The interplay between platform architecture and producers' design strategies for platform performance. *MIS Quarterly*, 43(4), 1249-1277.	2019	Modeling	c7
15	Information Systems Research	IS	Chen, J. W., He, L., Liu, H. Y., Yang, Y. H., & Bi, X. (2024). Background music recommendation on short video sharing platforms. *Information Systems Research*, *in press*.	2023	Empirical	c31
16	Information Systems Research	IS	Chen, J., He, S., & Yang, X. (2023). Platform loophole exploitation, recovery measures, and user engagement: A quasi-natural experiment in online gaming. *Information Systems Research*, 35(4), 1609-1633.	2024	Empirical - Field Experiment	c10
17	Journal of Management	Management	Chen, L., Yi, J. T., Li, S. L., & Tong, T. W. (2022). Platform governance design in platform ecosystems: Implications for complementors' multihoming decision. *Journal of Management*, 48(3), 630-656.	2022	Empirical	c17
18	Information Systems Research	IS	Chen, L. W., Rai, A., Chen, W., & Guo, X. T. (2024). Signaling effects under dynamic capacity in online matching platforms: Evidence from online health consultation communities. *Information Systems Research*, in press.	2024	Empirical	c32
19	Journal of Management	Management	Chen, Y., Pereira, I., & Patel, P. C. (2021). Decentralized governance of digital platforms. *Journal of Management*, 47(5), 1305-1337.	2021	Empirical	a11
20	Management Science	Management	Chung, H. D., Zhou, Y. M., & Ethiraj, S. (2023). Platform governance in the presence of within-complementor interdependencies: Evidence from the rideshare industry. *Management Science - STR*, *in press*.	2023	Empirical	c8

21	Academy of Management Journal	Management	Dattee, B., Alexy, O., & Autio, E. (2018). Maneuvering in poor visibility: How firms play the ecosystem game when uncertainty is high. *Academy of Management Journal*, 61(2), 466-498.	2018	Qualitative	a6
22	Management Science	IS	Deng, Y. P., Zheng, J. Y., Khern-am-nuai, W., & Kannan, K. (2022). More than the quantity: The value of editorial reviews for a user-generated content platform. *Management Science - IS*, 68(9), 6865-6888.	2022	Empirical - Field Experiment	c35
23	Management Science	Marketing	Derakhshan, M., Golrezaei, N., Manshadi, V., & Mirrokni, V. (2022). Product Ranking on Online Platforms. *Management Science - MKT*, 68(6), 4024-4041.	2022	Empirical - Field Experiment	a16
24	MIS Quarterly	IS	Dewan, S., Kim, J., & Nian, T. T. (2023). Economic impacts of platform-endorsed quality certification: Evidence from Airbnb. *MIS Quarterly*, 47(3), 1353-1368.	2023	Empirical	c32
25	Information Systems Research	IS	Foerderer, J., Lueker, N., & Heinzl, A. (2021). And the winner is ... ? The desirable and undesirable effects of platform awards. *Information Systems Research*, 32(4), 1155-1172.	2021	Empirical	c36
26	Marketing Science	Marketing	Fradkin, A., & Holtz, D. (2023). Do incentives to review help the market? Evidence from a field experiment on Airbnb. *Marketing Science*, 42(5), 853-865.	2021	Empirical - Field Experiment	c1
27	Marketing Science	Marketing	Fradkin, A., Grewal, E., & Holtz, D. (2021). Reciprocity and unveiling in two-sided reputation systems: Evidence from an experiment on airbnb. *Marketing Science*, 40(6), 1013-1029.	2023	Empirical	c25
28	Journal of Management	Management	Fuentelsaz, L., Garrido, E., & Maicas, J. P. (2015). A strategic approach to network value in network industries. *Journal of Management*, 41(3), 864-892.	2015	Empirical	c29
29	MIS Quarterly	IS	Geva, H., Barzilay, O., & Oestreicher-Singer, G. (2019). A potato salad with a lemon twist: Using a supply-side shock to study the impact of opportunistic behavior on crowdfunding platforms. *MIS Quarterly*, 43(4), 1227-1248.	2019	Empirical	c27
30	Management Science	IS	Gu, G., & Zhu, F. (2021). Trust and disintermediation: Evidence from an online freelance marketplace. *Management Science - IS*, 67(2), 794-807.	2021	Empirical - Field Experiment	c13
31	Information Systems Research	IS	Gu, M. L., Liu, D. P., & Kumar, S. (2024). Navigating platform-led affiliate marketing: Implications for content creation and platform profitability. *Information Systems Research*, *in press*.	2024	Modeling	c11

32	Management Science	Management	Hagiu, A., & Wright, J. (2020). Platforms and the exploration of new products. *Management Science - STR*, 66(4), 1527-1543.	2020	Modeling	a15
33	Management Science	Management	Hagiu, A., & Wright, J. (2024). Optimal discoverability on platforms. *Management Science - STR*, *in press*.	2024	Modeling	a8; a9
34	Information Systems Research	IS	Han, W., Wang, X., Ahsen, M. E., & Wattal, S. (2022). The societal impact of sharing economy platform self-regulations—An empirical investigation. *Information Systems Research*, 33(4), 1303-1323.	2022	Empirical	c38
35	Information Systems Research	IS	Hann, I. H., Koh, B., & Niculescu, M. F. (2016). The double-edged sword of backward compatibility: The adoption of multigenerational platforms in the presence of intergenerational services. *Information Systems Research*, 27(1), 112-130.	2016	Empirical	c29
36	Administrative Science Quarterly	Management	Henderson, R. M., & Clark, K. B. (1990). Architectural innovation: The reconfiguration of existing product technologies and the failure of established firms. *Administrative Science Quarterly*, 35(1), 9-30.	1990	Qualitative	c4
37	Strategic Management Journal	Management	Hsieh, Y. Y., & Vergne, J. P. (2023). The future of the web? The coordination and early-stage growth of decentralized platforms. *Strategic Management Journal*, 44, 829-857.	2023	Qualitative	c20
38	Management Science	IS	Huang, P., Lyu, G. Y., & Xu, Y. (2022). Quality regulation on two-sided platforms: Exclusion, subsidization, and first-party applications. *Management Science - IS*, 68(6), 4415-4134.	2022	Modeling	c20
39	MIS Quarterly	IS	Huang, P., Tafti, A., & Mithas, S. (2018). Platform sponsor investments and user contributions in knowledge communities: The role of knowledge seeding. *MIS Quarterly*, 42(1), 213-240.	2018	Empirical	c24
40	Information Systems Research	IS	Huber, T. L., Kude, T., & Dibbern, J. (2017). Governance practices in platform ecosystems: Navigating tensions between cocreated value and governance costs. *Information Systems Research*, 28(3), 563-584.	2017	Qualitative	c10
41	MIS Quarterly	IS	Hukal, P., Henfridsson, O., Shaikh, M., & Parker, G. (2020). Platform signaling for generating platform content. *MIS Quarterly*, 44(3), 1177-1205.	2020	Mixed Methods	c19
42	Management Science	Management	Ichihashi, S., & Kim, B. C. (2023). Addictive platforms. *Management Science - STR*, 69(2), 1127-1145.	2023	Modeling	a1

43	Management Science	Marketing	Immorlica, N., Lucier, B., Manshadi, V., & Wei, A. L. X. D. (2023). Designing approximately optimal search on matching platforms. *Management Science - MKT*, 69(8), 4609-4626.	2023	Modeling	c1
44	Information Systems Research	IS	Jiang, L. L., Hou, J. H., Ma, X., & Pavlou, P. A. (2024). Punished for success? A natural experiment of displaying clinical hospital quality on review platforms. *Information Systems Research*, *in press*.	2024	Empirical	c26
45	Information Systems Research	IS	Jiang, Z. R., Rai, A., Sun, H., Nie, C., & Hu, Y. H. (2023). How does online information influence offline transactions? Insights from digital real estate platforms. *Information Systems Research*, *in press*.	2023	Empirical	c25
46	Information Systems Research	IS	Jung, D. W., Kim, B. C., Park, M., & Straub, D. W. (2019). Innovation and policy support for two-sided market platforms: Can government policy makers and executives optimize both societal value and profits? *Information Systems Research*, 30(3), 1037-1050.	2019	Modeling	a13; a14
47	Information Systems Research	IS	Jung, J., Lim, H., Lee, D., & Kim, C. (2022). The secret to finding a match: a field experiment on choice capacity design in an online dating platform. *Information Systems Research*, 33(4), 1248-1263.	2022	Empirical - Field Experiment	c13
48	Information Systems Research	IS	Kannan, K., Saha, R. L., & Khern-am-nuai, W. (2022). Identifying perverse incentives in buyer profiling on online trading platforms. *Information Systems Research*, 33(2), 464-475.	2022	Modeling	a3
49	Management Science	Others	Kanoria, Y., & Saban, D. (2021). Facilitating the search for partners on matching platforms. *Management Science - SMS*, 67(10), 5990-6029.	2021	Modeling	c1
50	Organization Science	Management	Kapoor, R., & Agarwal, S. (2017). Sustaining superior performance in business ecosystems: Evidence from application software developers in the ios and android smartphone ecosystems. *Organization Science*, 28(3), 531-551.	2017	Empirical	c7
51	Information Systems Research	IS	Karhu, K., Gustafsson, R., & Lyytinen, K. (2018). Exploiting and defending open digital platforms with boundary resources: Android's five platform forks. *Information Systems Research*, 29(2), 479-497.	2018	Case Study	c11
52	Journal of Management Information Systems	IS	Kazan, E., Tan, C. W., Lim, E. T. K., Sorensen, C., & Damsgaard, J. (2018). Disentangling digital platform competition: The case of UK mobile payment platforms. *Journal of Management Information Systems*, 35(1), 180-219.	2018	Case Study	c4

53	Management Science	Management	Ke, T. T., & Zhu, Y. T. (2021). Cheap talk on freelance platforms. *Management Science - STR*, 67(9), 5901-5920.	2021	Modeling	c25
54	Strategic Management Journal	Management	Koo, W. W. (2024). Hybrid governance of platform entrepreneurs. *Research Policy*, 53(2), *in press*.	2021	Empirical	c7
55	Research Policy	Management	Koo, W. W., & Eesley, C. E. (2021). Platform governance and the rural-urban divide: Sellers' responses to design change. *Strategic Management Journal*, 42(5), 941-967.	2024	Experiment	c37
56	Journal of Consumer Research	Marketing	Kozinets, R. V., Ferreira, D. A., & Chimenti, P. (2021). How do platforms empower consumers? Insights from the affordances and constraints of reclame aqui. *Journal of Consumer Research*, 48(3), 428-455.	2021	Qualitative	c41
57	Management Science	Marketing	Kucukgul, C., Ozer, O., & Wang, S. Q. (2022). Engineering social learning: Information design of time-locked sales campaigns for online platforms. *Management Science - MKT*, 68(7), 4899-4918.	2022	Modeling	c13
58	Management Science	Others	Kwan, A. P., Yang, S. A., & Zhang, A. (2023). Crowd-judging on two-sided platforms: An analysis of in-group bias. *Management Science - Ops*, *in press*.	2023	Empirical - Field Experiment	c21
59	Information Systems Research	IS	Lee, D., & Mendelson, H. (2007). Adoption of information technology under network effects. *Information Systems Research*, 18(4), 395-413.	2007	Modeling	a5
60	Information Systems Research	IS	Leong, C., Lin, S., Tan, F., & Yu, J. (2023). Coordination in a digital platform organization. *Information Systems Research*, *in press*.	2023	Case Study	c10
61	Management Science	Marketing	Li, H., & Zhu, F. (2021). Information transparency, multihoming, and platform competition: A natural experiment in the daily deals market. *Management Science - MKT*, 67(7), 4384-4407.	2021	Empirical	c36
62	Management Science	IS	Li, J., Pisano, G., Xu, Y. J., & Zhu, F. (2023). Marketplace scalability and strategic use of platform investment. *Management Science - IS*, 69(7), 3958-3975.	2023	Modeling	c2
63	Information Systems Research	IS	Liang, C., Hong, Y. L., & Gu, B. (2024). Monitoring and home bias in global hiring: Evidence from an online labor platform. *Information Systems Research*, *in press*.	2024	Empirical	c28
64	Information Systems Research	IS	Liang, C., Hong, Y. L., & Gu, B. (2024). Monitoring and the cold start problem in digital platforms: Theory and evidence from online labor markets. *Information Systems Research*, *in press*.	2024	Empirical	c1

65	Information Systems Research	IS	Liang, C., Shi, Z., & Raghu, T. S. (2019). The spillover of spotlight: Platform recommendation in the mobile app market. *Information Systems Research*, 30(4), 1296-1318.	2019	Empirical	c19
66	Journal of Marketing Research	Marketing	Liu, J., & Cong, Z. W. (2023). The daily me versus the daily others: how do recommendation algorithms change user interests? Evidence from a knowledge-sharing platform. *Journal of Marketing Research*, 60(4), 767-791.	2023	Empirical	c24
67	Management Science	IS	Liu, M., Brynjolfsson, E., & Dowlatabadi, J. (2021). Do digital platforms reduce moral hazard? The case of Uber and taxis. *Management Science - IS*, 67(8), 4665-4685.	2021	Empirical	c41
68	Management Science	IS	Liu, Y., Lou, B. W., Zhao, X. Y., & Li, X. X. (2023). Unintended consequences of advances in matching technologies: Information revelation and strategic participation on gig-economy platforms. *Management Science - IS*, *in press*.	2023	Modeling	c19
69	Marketing Science	Marketing	Long, F., & Liu, Y. C. (2023). Platform manipulation in online retail marketplace with sponsored advertising. *Marketing Science*, *in press*.	2023	Modeling	c32
70	Journal of Marketing	Marketing	Luo, X. M., Tong, S. L., Lin, Z. J., & Zhang, C. (2021). The impact of platform protection insurance on buyers and sellers in the sharing economy: A natural experiment. *Journal of Marketing*, 85(2), 50-69.	2021	Empirical	c12
71	MIS Quarterly	IS	Malgonde, O., Zhang, H., Padmanabhan, B., & Limayem, M. (2020). Taming complexity in search of matching: Two-sided recommender systems on digital platforms. *MIS Quarterly*, 44(1), 49-84.	2020	Modeling	c1
72	Journal of Management Information Systems	IS	Malgonde, O., Zhang, H., Padmanabhan, B., & Limayem, M. (2020). Taming complexity in search of matching: Two-sided recommender systems on digital platforms. *MIS Quarterly*, 44(1), 49-84.	2022	Modeling	c15
73	Information Systems Research	IS	Mao, S. J., Dewan, S., & Ho, Y. J. (2023). Personalized ranking at a mobile app distribution platform. *Information Systems Research*, 34(3), 811-827.	2023	Modeling	a17
74	Research Policy	Management	Miremadi, I., Khoshbash, M., & Saeedian, M. (2023). Fostering generativity in platform ecosystems: How open innovation and complexity interact to influence platform adoption. *Research Policy*, 52(6), *in press*.	2023	Empirical	c20
75	MIS Quarterly	IS	Mohlmann, M., Zalmanson, L., Henfridsson, O., & Gregory, R. W. (2021). Algorithmic management of work on online labor platforms: When matching meets control. *MIS Quarterly*, 45(4), 1999-2022.	2021	Qualitative	c19

76	Journal of Management Information Systems	IS	Nan, G. F., Yao, L. N., Ho, Y. C., Li, Z. Y., & Li, M. Q. (2019). An economic analysis of platform protection in the presence of content substitutability. *Journal of Management Information Systems*, 36(3), 1002-1036.	2019	Modeling	c12
77	Journal of Management Information Systems	IS	Ng, K. C., Tang, J., & Lee, D. (2021). The effect of platform intervention policies on fake news dissemination and survival: An empirical examination. *Journal of Management Information Systems*, 38(4), 898-930.	2021	Empirical	c9
78	Information Systems Research	IS	Niculescu, M. F., Wu, D. J., & Xu, L. Z. (2018). Strategic intellectual property sharing: Competition on an open technology platform under network effects. *Information Systems Research*, 29(2), 498-519.	2018	Modeling	a12
79	Strategic Management Journal	Management	O'Mahony, S., & Karp, R. (2022). From proprietary to collective governance: How do platform participation strategies evolve? *Strategic Management Journal*, 43(3), 530-562.	2022	Qualitative	c20
80	Journal of Management Studies	Management	Ozalp, H., Cennamo, C., & Gawer, A. (2018). Disruption in platform-based ecosystems. *Journal of Management Studies*, 55(7), 1203-1241.	2018	Empirical	c40
81	Management Science	Others	Papanastasiou, Y., Yang, S. A., & Zhang, A. H. (2023). Improving dispute resolution in two-sided platforms: the case of review blackmail. *Management Science - Ops*, 69(10), 5695-6415.	2023	Modeling	c21
82	Management Science	IS	Parker, G., & Van Alstyne, M. (2018). Innovation, openness, and platform control. *Management Science - IS*, 64(7), 3015-3032.	2018	Modeling	c29; c4
83	Journal of Management Information Systems	IS	Pu, J. C., Nian, T. T., Qiu, L. F., & Cheng, H. K. (2022). Platform policies and sellers' competition in agency selling in the presence of online quality misrepresentation. *Journal of Management Information Systems*, 39(1), 159-186.	2022	Modeling	c33; c34
84	Research Policy	Management	Pujadas, R., Valderrama, E., & Venters, W. (2024). The value and structuring role of web APIs in digital innovation ecosystems: The case of the online travel ecosystem. *Research Policy*, 53(2), *in press*.	2024	Empirical	c3
85	Academy of Management Journal	Management	Rahman, H. A., Weiss, T., & Karunakaran, A. (2023). The experimental hand: How platform-based experimentation reconfigures worker autonomy. *Academy of Management Journal*, 66(6), 1803-1830.	2023	Qualitative	c16

86	Organization Science	Management	Rietveld, J., Schilling, M. A., & Bellavitis, C. (2019). Platform strategy: Managing ecosystem value through selective promotion of complements. *Organization Science*, 30(6), 1232-1251.	2019	Empirical	a9
87	Journal of Consumer Research	Marketing	Rifkin, L. S., Kirk, C. P., & Corus, C. (2023). A turn of the tables: Psychological contracts and word of mouth about sharing economy platforms when consumers get reviewed. *Journal of Consumer Research*, 50(2), 382-404.	2023	Experiment	c18
88	Information Systems Research	IS	Rolland, K. H., Mathiassen, L., & Rai, A. (2018). Managing digital platforms in user organizations: The interactions between digital options and digital debt. *Information Systems Research*, 29(2), 419-443.	2018	Empirical	a6
89	Research Policy	Management	Saadatmand, F., Lindgren, R., & Schultze, U. (2019). Configurations of platform organizations: Implications for complementor engagement. *Research Policy*, 48(8), 1-17.	2019	Qualitative	c6
90	Journal of Management	Management	Schmidt, J., & Foss, N. J. (2023). Modularity, adaptation problems, and the governance and problem-solving capabilities of core firms in ecosystems. *Journal of Management*, *in press*.	2023	Theoretical	a6
91	Management Science	IS	Sen, A., Grad, T., Ferreira, P., & Claussenb, J. (2023). (How) does user-generated content impact content generated by professionals? Evidence from local news. *Management Science - IS*, *in press*.	2023	Empirical - Field Experiment	c19
92	Management Science	Marketing	Shi, P. (2023). Optimal Matchmaking Strategy in Two-Sided Marketplaces. *Management Science - MKT*, 69(3), 1323-1340.	2023	Modeling	a7
93	Marketing Science	Marketing	Shi, Z. J., Srinivasan, K., & Zhang, K. F. (2023). Design of platform reputation systems: Optimal information disclosure. *Marketing Science*, 42(3), 500-520.	2023	Modeling	c15
94	Journal of Management Studies	Management	Skiti, T., Luo, X. M., & Lin, Z. J. (2022). When more is less: quality and variety trade-off in sharing economy platforms. *Journal of Management Studies*, 59(7), 1817-1838.	2022	Empirical	c34
95	Information Systems Research	IS	Song, W., Chen, J. Q., & Li, W. L. (2021). Spillover effect of consumer awareness on third parties' selling strategies and retailers' platform openness. *Information Systems Research*, 32(1), 172-193.	2021	Modeling	c16
96	Management Science	Marketing	Stouras, K. I., Erat, S., & Lichtendahl, K. C., Jr. (2024). Dueling contests and platform's coordinating role. *Management Science - MKT*, *in press*.	2024	Modeling	c24

97	Information Systems Research	IS	Tan, B., Anderson, E. G., & Parker, G. G. (2020). Platform pricing and investment to drive third-party value creation in two-sided networks. *Information Systems Research*, 31(1), 217-239.	2020	Modeling	a2
98	Journal of Management Information Systems	IS	Thies, F., Wessel, M., & Benlian, A. (2016). Effects of social interaction dynamics on platforms. *Journal of Management Information Systems*, 33(3), 843-873.	2016	Empirical	c13
99	MIS Quarterly	IS	Tian, J., Zhao, X., & Xue, L. (2022). Platform compatibility and developer mutihoming: A trade-off perspective. *MIS Quarterly*, 46(3), 1661-1690.	2022	Empirical	c17
100	Information Systems Research	IS	Tiwana, A. (2015a). Evolutionary competition in platform ecosystems. *Information Systems Research*, 26(2), 266-281.	2015	Empirical	c27
101	Journal of Management Information Systems	IS	Tiwana, A. (2015b). Platform desertion by app developers. *Journal of Management Information Systems*, 32(4), 40-77.	2015	Empirical	c8
102	Information Systems Research	IS	Um, S., Zhang, B., Wattal, S., & Yoo, Y. (2022). Software components and product variety in a platform ecosystem: A dynamic network analysis of WordPress. *Information Systems Research*, *in press*.	2022	Empirical	c3
103	Journal of Business Venturing	Management	Varga, S., Cholakova, M., Jansen, J. J. P., Mom, T. J. M., & Kok, G. J. M. (2023). From platform growth to platform scaling: The role of decision rules and network effects over time. *Journal of Business Venturing*, 38(6), *in press*.	2023	Qualitative	c20
104	Journal of Marketing	Marketing	Wang, Q., Chen, Y. B., & Xie, J. H. (2010). Survival in markets with network effects: product compatibility and order-of-entry effects. *Journal of Marketing*, 74(4), 1-14.	2010	Empirical	c4
105	Marketing Science	Marketing	Wang, Y. Y., Tao, L., & Zhang, X. X. (2024). Recommending for a multi-sided marketplace: A multi-objective hierarchical approach. *Marketing Science*, *in press*.	2024	Empirical - Field Experiment	c15
106	Research Policy	Management	Wen, W., Forman, C., & Jarvenpaa, S. L. (2022). The effects of technology standards on complementor innovations: Evidence from the IETF. *Research Policy*, 51(6), *in press*.	2022	Empirical	c39

107	Strategic Management Journal	Management	Wormald, A., Shah, S. K., Braguinsky, S., & Agarwal, R. (2023). Pioneering digital platform ecosystems: The role of aligned capabilities and motives in shaping key choices and performance outcomes. *Strategic Management Journal*, 44(7), 1653-1697.	2023	Mixed Methods	a10
108	Journal of Management Information Systems	IS	Xu, D., Hu, P. J. H., & Fang, X. (2023). Deep learning-based imputation method to enhance crowdsourced data on online business directory platforms for improved services. *Journal of Management Information Systems*, 40(2), 624-654.	2023	Modeling	c1
109	Management Science	Others	Yu, Q. P., Zhang, Y. M., & Zhou, Y. P. (2022). Delay information in virtual queues: A large-scale field experiment on a major ride-sharing platform. *Management Science - Ops*, 68(8), 5745-5757.	2022	Empirical - Field Experiment	c14
110	Management Science	Others	Zeng, Z. Y., Dai, H. C., Zhang, D. J., Zhang, H., Zhang, R. Y., Xu, Z. W., & Shen, Z. J. M. (2023). The impact of social nudges on user-generated content for social network platforms. *Management Science - Ops*, 69(9), 5189-5208.	2023	Empirical - Field Experiment	c19
111	Marketing Science	Marketing	Zha, Y., Li, Q., Huang, T. L., & Yu, Y. G. (2023). Strategic information sharing of online platforms as resellers or marketplaces. *Marketing Science*, 42(4), 659-678.	2023	Modeling	a3
112	MIS Quarterly	IS	Zhang, C., Song, P. J., & Lim, K. (2023). Standardize or let a thousand flowers bloom? Interface design coordination between software platforms. *MIS Quarterly*, 47(3), 1333-1352.	2023	Empirical - Field Experiment	c29; c7
113	Strategic Management Journal	Management	Zhang, Y. C., Li, J. J., & Tong, T. W. (2022). Platform governance matters: How platform gatekeeping affects knowledge sharing among complementors. *Strategic Management Journal*, 43(3), 599-626.	2022	Empirical	c23
114	Information Systems Research	IS	Zhao, X., Xue, L., Song, P. J., & Karahanna, E. (2023). Direct communication and two-sided matching quality on a digital platform: A perspective of choice based on consideration set. *Information Systems Research*, *in press*.	2023	Empirical	c5
115	Information Systems Research	IS	Zheng, J. Y., Wang, Y. W., & Tan, Y. (2023). Platform refund insurance or being cast out: Quantifying the signaling effect of refund options in the online service marketplace. *Information Systems Research*, 34(3), 910-934.	2023	Modeling	c15
116	Marketing Science	Marketing	Zhong, Z. M. (2023). Platform search design: The roles of precision and price. *Marketing Science*, 42(2), 293-313.	2023	Modeling	c25

Chapter 2

Platform Partnerships and Growth: Empirical Analysis of ECF Platforms

Abstract: This study examines how and when the resources that a platform provides to its complementors through external partners can affect the growth of the platform. Platforms share resources with complementors to support them in value creation and capture. We build on the literature on multisided platform ecosystems and the resource-based view and contend that through partnerships with independent service providers, platforms can offer varied support and resources to complementors. We hand collect a novel data set of 3,372 crowdfunding campaigns that raised funds on 32 equity crowdfunding platforms across 12 European countries from the emergence of equity crowdfunding industry, i.e., from 2012 to 2022 period, to examine the effects of partnerships on platform growth and the boundary conditions of these effects. We find that platforms with more partnerships attract more complementors, but the average size of complementors is significantly smaller. We also find that these effects are moderated by the diversification of the platform, such that diversification magnifies the positive effect of partnerships on the number of complementors entering the platform but also has an adverse effect on complementor size. The study offers several important implications for platform managers, complementors, and government institutions.

Keywords: complementor entry; crowdsourcing; platform growth; platform partnerships; platform resources.

PLATFORM PARTNERSHIPS AND GROWTH: EMPIRICAL ANALYSIS OF ECF PLATFORMS

INTRODUCTION

Platforms have a meta-organizational structure that is more formal than open markets but less coordinated than traditional firms (Kretschmer et al., 2022). This structure allows platforms to grow quickly by delegating value creation and capture to complementors –but at the same time makes platform growth dependent on complementors (Boudreau & Jeppesen, 2015; Rochet & Tirole, 2003). Previous studies on platforms have examined platform growth (McIntyre & Srinivasan, 2017), focusing mainly on a platform's own resources to attract complementors. Although platforms can offer access to resources through internal sourcing, these internal "resources rarely act alone in creating or sustaining competitive advantage" (Wade & Hulland, 2004, p. 123) and their effect on the platform performance and competitive advantage can be magnified by the deriving synergies with other resources (Adegbesan, 2009).

In fact, platforms are increasingly relying on external partnerships to accumulate resources (Lee et al., 2022; Zeng et al., 2023). For example, Amazon provides complementors (i.e., sellers) access to its network of third-party logistics partners such as DHL and FedEx, which create synergies with the platform technology and reach to not only provide value to complementors in showcasing their product to a large number of users, but also in completing the transaction by delivering the purchased goods (Andreoli-Versbach & Gans, 2024). Such resources can increase the attractiveness of the platform for complementors (Chen et al., 2022).

Our study examines how and when the resources that a platform provides to its complementors through external partners can affect the growth of the platform. Complementors are firms and individuals who use platform technology to cocreate products and sell to platform users (Cenamor, 2021). Complementors alone may not have sufficient resources to create and capture value on the platform and may require platform support (Cenamor & Frishammar, 2021; Gastaldi et al., 2024). The prior literature has found that platforms can share a number of resources with complementors, including technological resources, such as APIs (application programming interfaces) and SDKs (software development kits; Engert et al., 2023; Karhu et al., 2018) and customer-related information, such as user data and demand trends (Fang et al., 2021; Kapoor 2014). These resources can help complementors, for instance, integrate their products with the platform (Engert et al., 2022) and develop more innovative products (Wen et al., 2022).

The platform can also provide these resources through external partnerships. We build on the literature on the resource-based view (RBV) that argue that firms can engage in partnerships to acquire valuable resources (Barney, 1991; Rothaermel, 2001) and on the literature on platform ecosystems that have found that, by sharing valuable resources, a platform can increase its attractiveness for complementors (Boudreau & Jeppesen, 2015; Chen et al., 2022). Hence, we argue that partnerships can help a platform increase its attractiveness for complementors. We also hypothesize a strategic trade-off and boundary condition related to this main effect (Cennamo & Santaló, 2013; Karhu et al., 2024). Specifically, we propose that while partnerships can increase the number of complementors entering a platform, they can reduce the overall complementor size. Furthermore, we propose that these effects are moderated by the level of diversification of the platform. A diversified platform compared to a specialist platform can have a greater effect of partnerships on the attractiveness of the

platform for complementors, but it can also have a greater negative effect on the size of the complementor.

We hand collect a novel data set of 32 equity crowdfunding (ECF) platforms across 12 European countries over the 2012-2022 period, that is, from the emergence of the ECF industry (Vulkan et al., 2016). ECF platforms connect complementors (startups) and a crowd of users (investors). This setting is ideal for examining how and when the resources that a platform provides to its complementors through external partners can affect the growth of the platform. Since its legalization in Europe in 2012, the ECF industry has seen rapid growth with increasingly tough competition between platforms and incumbents to attract complementors (Goldstein et al., 2019; Mochkabadi & Volkmann, 2020). Yet, ECF platforms do not necessarily own and thus offer attractive resource internally and often leverage partnerships with external resource providers (Cumming et al., 2021). We use scraping tools to collect data on ECF campaigns to measure platform growth and blog posts that the platforms published on their websites to capture the partnerships of these platforms. We triangulate our data from various established databases, including Pitchbook and Crunchbase. Over our observation period, we identify 3,372 successful ECF campaigns and 68 strategic partnerships formed by the 32 ECF platforms.

We find that an increase in the number of platform partnerships is associated with an increase in the number of complementors on the platforms, but on average partnerships attract complementors of smaller size. We also test how the effect of partnerships on the growth of platform changes with the platform diversity, i.e., whether a platform attracts complementors from a diverse set of sectors or is focused on a particular sector. ECF platforms may attract complementors (startups) from one particular industry, thus providing specialized services, or they may attract and fund complementors (startups) from all the industries, representing a more diversified platform. We find that platform diversification magnifies the positive effect

of partnerships on the number of complementors entering the platform but also has an adverse effect on complementor size.

Our study contributes to the literature on platform ecosystems and crowdfunding. First, we add to existing knowledge on crowdfunding platforms and their strategies While previous literature has considered platform strategies such as pricing and ancillary services (Dushnitsky et al., 2022), we add another dimension to crowdfunding platform strategy – i.e., to partner with competitor and non-competitor incumbents to provide a greater value to the complementors. Furthermore, previous literature has focused primarily on the funding success of crowdfunding campaigns (Parhankangas & Renko, 2017) and the subsequent strategies of the crowdfunded startups (Cong & Xiao, 2024), we complement this research by highlight how the strategies by the ECF platforms can affect the number and size of complementors (startups) crowdfunding on the platform. We also contribute to the literature on platform governance (Chen et al., 2022). Advancing prior studies showing that platforms can own resources to attract complementors (for examples, see Boudreau & Jeppesen, 2015; Engert et al., 2023), we find that platforms can also use partners' resources to provide incentives to complementors and increase their attractiveness. Finally, we add to the literature on multisided platform competition (e.g., Cennamo & Santaló, 2013; McIntyre & Srinivasan, 2017; Rietveld & Shilling, 2021) by showing that platforms engage in strategic partnerships with the external actors to gain competitive advantage and the benefits and boundary conditions of these decisions.

THEORY AND HYPOTHESES

Platforms, an increasingly common organizational structure, serve as intermediaries between complementors, i.e., independent firms or individuals who offer their products and services through the platform, and final users (Cenamor, 2021). Unlike traditional firms,

platforms do not offer standalone products. Instead, they rely on complementors for value cocreation (Baldwin & Clark, 2000; Kretschmer et al., 2022). Therefore, the growth of a platform depends on its attractiveness to a large number of complementors (McIntyre & Srinivasan, 2017; Rochet & Tirole, 2003).

A platform aims to attract complementors by contributing to their value creation and capture (Chen et al., 2022). Complementors can get a variety of benefits from joining a platform, such as increased sales, a higher likelihood of venture capital investments, and access to networks (Belleflamme et al., 2015; Ceccagnoli et al., 2012). However, some characteristics of the platform can also discourage complementors from joining a platform. For example, platforms can promote 'free riding' behavior, where a complementor takes advantage of the innovation of other complementors to support its sales (Cennamo & Santaló, 2019). Platforms can also induce competition for bargaining power, where a growing platform can gain significantly greater power against the smaller complementors (Cutolo & Kenney, 2021). Given that complementors may have to invest in platform-specific resources to build products using platform technologies and yet face risks related to value capture on the platform (Zhu & Liu, 2018), complementors may be hesitant to join a platform ecosystem (Ozalp et al., 2018).

Platform Resources and Growth

The resource-based view literature argues that the resources, especially valuable, rare, inimitable, and non-substitutable resources (Barney, 1991), owned by a firm influence its performance levels and competitive advantage (Sedera et al., 2016). However, these 'resources rarely act alone in creating or sustaining competitive advantage' (Wade & Hulland, 2004, p. 123) and their effect on performance and competitive advantage is magnified by –and needs to be considered with respect to –the deriving synergies with other resources (Adegbesan, 2009). In the context of platform ecosystems, the resources provided by the

platform to complementors may engender synergies and help complementors create and capture value (Wu et al., 2022).

In fact, previous works in the literature on information systems (Eaton et al., 2015; Hein et al., 2019), management (Fang et al. 2021; Tiwana 2015), and platform ecosystems (Eisenmann et al., 2009; McIntyre & Srinivasan, 2017) have shown that platforms can increase their attractiveness to complementors by providing a variety of resources. Resources can be tangible, such as monetary incentives (Boudreau and Jeppesen, 2015) and boundary resources (Ghazawneh & Henfridsson, 2013), or intangible, such as information (Kim & Choi, 2010), system reputation (Fang et al. 2020; Foerderer 2020), and cues about the platform's commitment to continuously develop the platform ecosystem (Gawer & Henderson, 2007).

Resources can provide a number of benefits to complementors. For example, Daradkeh (2023) found that boundary resources can the uncertainty of complementors regarding the value creation and capture on the platform. Foerderer et al. (2021) showed that enabling star rating or any type of feedback-sharing mechanism increases the innovation capabilities of complementors. Rietveld et al. (2019) found that platforms can selectively provide rewards to orchestrate platform growth. Furthermore, platform resources can help complementors integrate their products with the platform (Hilbolling et al., 2020), reduce their platform-specific costs (Cennamo et al., 2018), and develop more innovative products (Huber et al., 2022).

Platform Partnerships and Attractiveness to Complementors

The rise of digital platforms has led to a novel interpretation of resources and their effect on firm performance and competitive advantage (Helfat et al., 2023; Helfat & Raubitschek, 2018). The earlier studies on platforms have focused on the use of a platform's

own resources to support complementors (for review, see Chen et al., 2022). More recently, platform scholars have started to examine those resources that are owned, exchanged, or appropriated among crowds of suppliers and consumers residing outside the firm boundaries (Zeng et al., 2021).

In general, the benefits that complementors can accrue from platform resources may increase the attractiveness of the platform for complementors (Boudreau & Jeppesen, 2015). However, in order to grow faster, platforms may only develop scalable resources, reducing their ability to support complementors (Cennamo, 2018; Giustiziero et al., 2023; Veiga et al., 2017). Furthermore, platforms alone may not have the resources to support the diverse needs of heterogeneous complementors –and therefore to attract a large number of complementors (Rietveld & Eggers, 2018).

Filling this resource gap between the platform offerings and complementor needs, an independent community of service providers (SPs) tends to emerge around the platform ecosystem that provides various services to complementors (Cutolo et al., 2022). These SPs arrange themselves in an open exchange market where complementors could approach these SPs directly to access the resources. However, complementors may face high costs and uncertainty in making a deal directly with these SPs (Bester, 1993). On the other hand, a platform with a strong bargaining power can engage in partnership with these SPs to leverage their resources and provide value to complementors in an 'intermediated' way (Jovanovic et al., 2022). Therefore, complementors may prefer to access these SPs' resources through the platform, increasing the attractiveness of the platform for complementors.

Partnerships can add to the set of valuable resources that platforms share with complementors. For example, partnerships can increase the marketing, operational, and technological resources shared by a platform with complementors (Das et al., 1998). Partnerships can also provide information and legitimacy cues (Srinivasan & Venkatraman,

2018), platform-specific training (Suarez & Cusumano, 2009), and visibility (Rietveld et al., 2021) to complementors. The shared resources between a platform and crowds of suppliers are effective in promoting platform growth (Park et al., 2004).

For instance, Airbnb's partnerships with professional photography firms help hosts (complementors) provide better quality listings to platform users and increase occupancy rates by an average of 8.98% (Zhang et al., 2022). Netflix's partnerships with content distribution networks (such as Vodafone) allow movie producers (complementors) to quickly expand their audience (Adhikari et al., 2015). Finally, Amazon's partnerships with delivery firms (such as DHL) support the Prime delivery program that allows sellers (complementors) to ship their products to platform users in one day and enable highly accurate package tracking, helping sellers and Amazon gain an advantage over competitors (Rikap, 2022).

In sum, we propose that incorporating resources from various partners helps platforms provide a wider range of resources and services to complementors, boosting their ability to create and capture value. This offer of resources provided by the platform thanks to its SPs can attract a greater number of complementors to the platform.

H1a: The greater the number of platform partnerships, the greater the number of complementors entering the platform.

Strategic Tradeoffs in Growth through Partnerships

Platforms can grow by not only increasing the number of complementors, but also promoting the quality (Rietveld et al., 2019; Taeuscher & Rothe, 2021), diversity (Cennamo & Santaló, 2013; Rietveld & Eggers, 2018), scale (Aggarwal et al., 2023; Tavalaei & Cennamo, 2021) and innovativeness (Foerderer et al., 2021; Wen et al., 2022) of complementors. However, platforms face several hurdles and tradeoffs in orchestrating complementors and stimulating growth (Karhu et al., 2024). For example, platforms may need

to choose to grow either the number or the diversity of complementors (Cennamo & Santaló, 2013). If a platform cannot manage these strategic tradeoffs, the performance of complementors and the platform can be reduced (Rietveld et al., 2020). In this article, we look at one such tradeoff between using partnerships to increase the number of complementors and the size of complementors on the platform.

Platform partnerships can promote competition among complementors to access the shared resources between the platform and the partners (Cozzolino et al., 2021). This may result in 'free-riding behavior' where complementors join the platform not with the intention of contributing to its value creation, but rather to exploit the shared resources for their own benefit without adding significant value in return (Cennamo & Santaló, 2019). The unwanted and un-orchestrated competition can reduce complementor innovation and performance (Boudreau & Jeppensen, 2015).

We argue that the resources shared by a platform through partnerships can reduce the average size of complementors on the platform. This could happen due to the differences in the resource requirements of different sets of complementors and their ability to access platform resources (Tavalaei & Cennamo, 2021). As the smaller complementors may not have the necessary resources to support them and be successful on the platform, they may derive a greater value from the resources shared by the partners as compared to the value derived by the larger complementors.

H2a: The greater the number of platform partnerships, the smaller the size of complementors joining the platform.

Partnerships of Diversified and Specialized Platform

Platform diversification refers to the extent to which a platform permits complementors from various sectors (Aversa et al., 2021; Cennamo & Santaló, 2013).

Depending on the market opportunity, platforms may decide on a certain degree of diversification to meet the needs of complementors and users (Rietveld & Eggers, 2018). There may be important differences between the resource profiles of specialists and diversified platforms. Specifically, specialized platforms serve the needs of complementors in a particular sector by offering sector-specific resources (Wareham et al., 2014). For example, Etsy offers specialized, community-oriented resources focused on smaller, creative entrepreneurs (Sköld & Karlsson, 2013). These resources allow specialized platforms to attract complementors who want to develop a product in that sector.

In contrast, a generalized platform may focus on resources with broader applications (Karhu et al., 2018). These resources allow a platform to focus on the core resources that are adaptable across sectors and attract a diverse set of complementors (Engert et al., 2022). For example, Amazon provides generalized, scalable resources like Fulfillment by Amazon (FBA) and advanced advertising tools for high-volume sellers (Cui et al., 2019). When a platform diversifies, it can tap into a wider range of markets and attract complementors from multiple sectors, increasing its overall user base and potential revenue (Greve & Song, 2017).

When a platform is more diversified, the SPs can help the platform share a diversified set of resources in addition to the core resources shared by the platform with complementors. The resources shared by the partners can create higher synergy with the set of resources of a diversified platform, allowing complementors to access highly valuable core resources of the platform and specialized resources of the partners. Hence, the positive effects of partnerships are enhanced when a platform is diversified.

H1b: The greater the level of diversification of a platform, the greater the positive effect of partnerships on the number of complementors entering the platform.

Finally, we expect that, on a diversified platform as compared to a specialist platform, the negative consequences of engaging in partnerships on complementor size outweigh the benefits. The smaller complementors, who lack the foundational resources or capabilities to compete effectively on their own, are more likely to draw higher value from the resources shared by the external partners on a diversified platform compared to the resources shared on the specialized platform (Deilen & Wiesche, 2021). On the contrary, larger complementors often already possess the necessary capabilities and resources to succeed and create value on their own and may find less value in joining a diversified platform for the partner resources (Gastaldi et al., 2024).

Furthermore, smaller complementors might be able to use shared resources on a diversified platform more effectively to drive their growth compared to using those resources to compete on a specialist platform. On a diversified platform, such complementors can find a niche market to find the optimal balance between value creation and capture (Cenamor, 2021). The larger complementors who may already have established products and services might benefit from using the partner's resources to compete on a focused market. Figure 1 highlights a summary of our hypotheses.

H2b: The greater the level of diversification of a platform, the greater the negative effect of partnerships on complementor size.

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RESEARCH METHODOLOGY

Empirical Context: Equity Crowdfunding Platforms

To understand how and when the resources that a platform provides to its complementors through external partners can affect the growth of the platform, we examine

the equity crowdfunding (ECF) industry. ECF is a novel form of entrepreneurial financing, first legalized by the UK in 2012. ECF platforms connect startups (complementors) with the crowd of investors (users). Initially seen as the source of last resort, ECF has now established itself as a source of financing even for large complementors with high quality and status (Walthoff-Borm et al., 2018). Indeed, the ECF market has grown from 28 million dollars in 2012 to over 1.5 billion dollars in 2020 worldwide (Cambridge Centre for Alternative Finance, 2020). This setting is ideal for addressing our research question, because equity crowdfunding is a relatively new phenomenon with high industry growth and intense competition to attract complementors to the platform (Vulkan et al., 2016). Yet the platforms are small enough so that they do not have/cannot develop all the resources internally.

Through ECF, startups raise funds by issuing an equity stake in the firm to a crowd of investors. Startups create a pitch using text and/or video on the ECF platforms to launch the campaign. During the campaign, the startups engage in discussion with the crowd of investors to answer any queries and provide additional data. A campaign lasts on average 45 days, depending on the platform policies. The crowd of investors evaluates the startup based on the pitch, discussion, and other available sources of information and decides whether and how much to invest in the startup campaign. Most ECF platforms use an ‘all-or-nothing’ business model, in which a startup will receive funding only if the fundraising goal is met by at least 100 percent.[1]

ECF platforms generate revenue by charging a fixed percentage of the fundraising to the startups and a fixed commission to the investors on the sale of the securities. Therefore, platforms can maximize revenue by increasing their attractiveness for a greater number of

[1] Equity Crowdfunding (ECF) platforms allow complementors to raise funding beyond their initial target during the designated campaign period. This "overfunding" mechanism permits startups to accept funding that exceed the pre-set target. Consequently, the startup is required to issue a proportionally higher percentage of equity to the investors while maintaining the same pre-money valuation initially set for the campaign.

platforms, helping complementors in getting maximum funding from the platform investors, and providing support to complementors in having a successful exit. Before joining the platform, startups can access the resources shared by the platform and the partners to, for instance, build their pitch, complete legal requirements such as registering the company, and get a fair valuation on their firm. After the campaign is successful, the startup becomes part of the 'funded club' and engages with the platform until it gets a market exit[2] or files bankruptcy. Startups provide regular updates to investors, engage in active discussions with them, and seek platform approval before any further fundraising or exit event. In some cases, the platform may even have a board seat at the startup.

ECF platforms may compete with venture capitalists (VCs) to attract startups and investors. Different from VC firms, platforms might not have the knowledge and/or resources to provide additional value to the startups (Chandna, 2022). To be competitive with VCs, ECF platforms can engage in partnerships to provide additional support and services similar to those provided by the VCs to startups (Estrin et al., 2018). In addition, they need to ensure a steady flow of complementors to meet the needs of the crowd of investors. Therefore, in this article, we look at how and when the resources that an ECF platform provides to complementors through external partners can promote platform growth.

Data Collection

Sample identification

We build a novel data set that encompasses a diverse set of ECF platforms and complementors across Europe. Our data set spans from the beginning of the ECF, or from 2012 through 2022, and draws from multiple established data sources including Pitchbook

[2] Market exit is an event where a startup gets merged/acquired by another firm or it issues an initial public offering (IPO; Arora et al., 2021).

and Crunchbase, and manual scraping of the platform websites over multiple rounds. We collect data at the platform, complementor, and campaign levels to support our analyses.[3]

----------INSERT TABLE 1 ABOUT HERE----------

To identify equity crowdfunding platforms in Europe, we download data from the Pitchbook database. Pitchbook categorizes crowd-investing platforms under the category of 'service providers.' We identify 380 crowdfunding platforms in Europe. We remove the 279 platforms that have had less than 5 successful campaigns on the platform until 2022, the last year in our data period. We consider all the platforms that were present before the initial year of our study, i.e., 2012, and also the platforms that were founded during our sample period. The platforms that were operating before the year 2012 were engaged in other types of services such as reward-based crowdfunding and made the switch to focus on equity-crowdfunding after its legalization.

We visit the website of each platform to check that they allowed 'free matching'[4] between the startups (complementors) and the investors (users) and focused on equity crowdfunding.[5] Through this exercise, we remove another 44 platforms from our sample. Among the remaining 37 platforms, we remove the five platforms for which we could not find complete data related to partnerships or campaigns.[6] Table 1 describes our sample selection and filtering process to identify the platforms. Therefore, we have a sample of 32 platforms

[3] We refer to the startups raising funding as complementors and the investors as the final users. We make a distinction between a startup (complementor) and a campaign (product). A startup may launch a campaign multiple times on a platform and even may launch a campaign on a competing platform.
[4] ECF platforms may either allow users to directly select and invest in the startup of their choice, known as the 'free matching' model, or offer a pooled investment option, where users invest in a fund that subsequently allocates the capital to various startups. The latter is referred to as the 'syndicate' model (Mochkabadi & Volkmann, 2020).
[5] We make a distinction between equity crowdfunding campaigns and other crowdinvesting financing such as real estate and debt-based campaigns by explicitly selecting the campaigns which offer equity stake in the registered firm in order to raise funds.
[6] The missing data was either due to the unavailability of the campaigns data on the platform website or partnership data due to missing date stamps on the blog posts.

spanning 11 years or 44 quarters and 12 European countries.[7] Figure 2 shows the platforms in our sample that engaged in partnerships. It shows the year of creation, the country of headquarters, and the profile of the partnership.

----------INSERT FIGURE 2 ABOUT HERE----------

Data about campaigns and partnerships

First, we collect data from the ECF campaigns by scrapping the data from each platform website. Most of the platforms in our sample maintained a list of the 'funded campaigns' on their website. We capture data on a number of variables including the funds raised, target, equity issued, and complementor valuation of each successful campaign.[8] We triangulated the missing data from the Wayback machine, website source codes, Pitchbook, Crunchbase, and YouTube videos. We record the number of campaigns funded on a platform and their fundraising date.

Second, we visit the website of each complementor, or in the absence of the website, its social media page, and also triangulate it with Pitchbook and government databases, such as Company House, to collect startup-level data, i.e., startup sector and headquarter. Third, we collect data on platform partnerships from the platform website. One unique feature of digital platforms is that they maintain an active blog which not only allows them to communicate with the platform stakeholders but also scores higher in organic searches on various search engines (Vieira et al., 2022). We scrape the title, text, and date of the blog posts published by the platforms.

[7] We note that while we started with platforms in all the European countries, we lose some countries in our final sample due to our filtering process such as our focus on platforms that have had at least five ECF campaigns. That is, they either did not have ECF platforms, or the platforms had not hosted more than five campaigns.
[8] One limitation of our data collection strategy is that platforms removed unsuccessful campaigns from the website. Hence, we only capture successful campaigns on a platform.

Following previous studies that analyzed third-party news publishers and Factiva to collect data on firm partnerships and alliances, we examine these blog posts to hand-collect a novel data set of platform partnerships (for e.g., see Schilling, 2009; Zhu & Westphal, 2021). Through large language models (LLMs) such as BERT, we analyze the texts of these blog posts and identify posts related to the platform partnerships. This approach is preferable to the use of analyst reports or firm announcements to investors, for example. We can include both types of platforms: those that participated in partnerships and those that did not (see Appendix Table 1), and thus we reduce the self-selection bias. Furthermore, the use of corporate blogs also helps us avoid any bias toward larger platforms and partners brought on by the data from third-party news sources and aggregators (e.g., Aggarwal, 2019; Burchard et al., 2021).

Fourth, we collect data on a platform's internal resources. We collect such information by visiting each platform's web page. Platforms maintain separate pages to provide information to investors that might help them in deciding about their investments and startups that might help them with their fund-raising campaign or further support beyond the campaign. Such information to startups includes any resources offered by the platform, such as pitch development kits and advisory for further fundraises from the VCs. We collect such information to capture whether a platform supports complementors through internal sourcing of the resources.

Fifth, we collect platform data such as platform incorporation date and headquarters (HQ) location. We also capture the data on all the funds raised by the platform, either through an ECF or traditional financing, and whether the platform is traded publicly from Pitchbook and Crunchbase to include platform-level controls in our models. We triangulate the missing data using sources such as Pitchbook and Crunchbase.

Finally, we aggregate the collected data to create a platform-quarter panel data set (e.g., Rietveld et al., 2020; Thies et al., 2018). In sum, our final sample is comprised of 32

platforms, and 3,372 campaigns, for a total of 815 observations at the platform-quarter level. This final data set includes all types of platforms – those that engaged in partnerships and those that did not, and those that engaged in internal sourcing of resources for complementors and those that did not.

Dependent Variables

Complementor Entry. Platform research has extensively focused on explaining the factors affecting a platform's attractiveness for complementors (McIntyre & Srinivasan, 2017). Prior research has measured a platform's attractiveness using the number of products announced by complementors on the platform (e.g., Boudreau & Jeppesen, 2015; Chen et al., 2022). Following previous research on crowdfunding platforms (e.g., Wang et al., 2019), we measure a platform's attractiveness to complementors by capturing the number of campaigns funded on the equity crowdfunding platforms. A platform that is more attractive to a potential set of complementors should receive a larger number of campaigns. We calculate the number of campaigns as a count variable representing the number of ECF campaigns funded per quarter on a platform (Wessel et al., 2017). We built the variable manually by scraping all the funded campaigns listed by the platforms on their website. We lead the variable by one quarter to examine the effect of partnerships and control variables at time t on the number of campaigns at time t+1.

Complementor Size. Platforms can grow by increasing not only the number of complementors, but also their size. Given that platforms may face strategic tradeoffs in their growth, it is important for a platform to consider how its actions affect complementors. We measure the complementor size using the variable average of total funds raised in a quarter by a startup. From the perspective of the platform and the users, a larger startup is the one that raises the most funds on the platform. It allows the platform to not only earn a greater

revenue,[9] but also televise the funding performance of the campaign. Similarly to our previous dependent variable, we take a log and lead the variable by 1 quarter.

Independent Variables

Partnership. We define a partnership as a non-equity collaboration between a platform and a third-party actor to share resources for mutual benefits (Reuer & Devarakonda, 2016). We create our platform partnership variable from the blog posts published by all the platforms on their website.[10] We employ the top2vec model in Python to analyze the text of the blog posts and identify and cluster the blog posts based on the different topics in the data (e.g., Fedorova & Stepanov, 2023).[11] Recent works have used topic modeling to analyze the narratives of textual data in management research (e.g., Haans, 2019; Kaplan & Vakili, 2015) including articles on platform ecosystems (e.g., Cutolo & Ferriani, 2023; Taeuscher et al., 2022; Van Angeren et al., 2022). In our case, top2vec models have significant advantages over keyword analysis (a method used traditionally in the partnership literature, e.g., Schilling, 2009). Specifically, in our analysis, we could differentiate not only between the partnership posts and non-partnership posts but also between the different types of platform partnerships, i.e., with service providers and complementors (which is outside the scope of our study).

Our topic model identifies 103 topics among all the blog posts in our sample. Appendix Table A2 shows the keywords in the top 15 topics and our interpretation of the topics. The word-embedded topic modeling approach as opposed to keyword analysis allows us to account for the different meanings of the partnerships in our text data. The word

[9] Platforms typically charge a fixed percentage of the total funds raised during a campaign as a commission fee for facilitating transactions. As a result, the higher the amount a startup raises, the greater the commission fee it pays to the platform, directly contributing to increased platform revenue.
[10] A corporate blog is a website frequently updated by a firm representative to share information with the platform's stakeholders (Seltzer & Mitrook, 2007).
[11] We use Google Translate to translate all the blog posts into English before performing top2vec modelling.

'partnership' appears in multiple unrelated topics in our analyses, confirming the need to conduct an advanced topic analysis and group the posts based on their similarity (see Appendix Table A3). We select all the topic containing words "partnership," "alliance," "agreement," and "collaboration." Then we go through all the documents in each of the topics to select the documents that talk about a platform's partnership with the service provider. The ECF platforms in our sample engaged in partnerships with market actors, such as accelerators, campuses, and corporates. All of the posts selected in this step are from a single topic as identified in the topic modelling. We record 68 partnerships between platforms and service providers in our data period. We measure the number of partnerships as the log of sum of partnerships made by a platform in a quarter (e.g., Huang et al., 2013).

Platform Diversification. To test the boundary conditions of our main hypotheses, i.e., the effects of partnerships on platform growth through quantity and size of complementors, we test the moderating role of platform diversification. It captures whether a platform attracts campaigns from a particular sector or a more diverse set of sectors. We use the variable primary industry sector defined by Pitchbook. For the startups that we could not collect industry data through Pitchbook, we triangulate the data using campaign pages and Crunchbase. We use the Herfindahl Index (HHI) measure to capture the diversification of the platforms (Ahsan & Musteen, 2021; Coakley et al., 2022). We take the proportion of all the funds raised by the startups in a given industry in a quarter on a platform to all the funds raised on the platform in that quarter. We subtract the HHI from 1 to measure our platform diversification variable.

Control Variables

We include a series of variables in our model to control for possible confounding effects. Specifically, we seek to control for various performance and network-driven effects (Thies et al., 2018; Wessel et al., 2018). Based on previous research on crowdfunding

platforms (Belleflamme et al., 2015), at the campaign level, we control for the average of *equity* issued by the startups to raise funding, and the average *valuation* of the startups who raised funding in a quarter. We take logs to account for the skewness of the data. We also control for the age (in years) of an average startup attracted by a platform in a quarter. We extracted the variables using the Pitchbook and Crunchbase databases and triangulated them with the data from the Internet Archive Wayback Machine and the fundraising campaign pages.

We also control for the provision of resources through internal arrangements. We go to each platform website to capture whether a platform engages in providing resources to complementors through internal arrangements as well. If a platform provides such services, we record it as 1 and 0 otherwise. Furthermore, platform-related events such as fundraising, M&As, and IPO could also bias the results. We record a cumulative variable measuring the number of times a platform engaged in such fundraising events. We also control for the platform age (in years) and the platform headquarter country. It is also plausible that some time-related factors confound our results. We include *quarter-fixed* effects to account for unobserved heterogeneities and control for these alternate explanations. Table 2 presents the descriptions of the various variables in our study.

----------INSERT TABLE 2 ABOUT HERE----------

RESULTS

Descriptive Statistics

Table 3 provides a distribution of the campaigns in our sample by industry with respect to the distribution of all the startups founded between 2012 and 2022 in Europe by

industry.[12] We notice that the startups in Business to Consumer (B2C) industry overly choose to raise their funds though ECF platforms. This could be influenced by the extra advantages of crowdfunding, which include the ability to promote products to an audience that can also serve as potential users of the B2C startup in question (Angerer et al., 2017).[13]

----------INSERT TABLE 3 ABOUT HERE----------

Table 4 provides summary statistics and correlations for the variables used in the principal analyses. From these correlations, we note that *partnership* has a positive and significant correlation with complementor *entry* and a significant negative correlation with *complementor size,* as predicted. We also note that internal resources have a positive correlation with the partnership variable, suggesting that platforms that participate in providing resources to complementors through internal sources are also those that provide resources through partnerships. Furthermore, the variable *valuation* is positively correlated with complementor *entry*, suggesting that platforms that attract complementors with higher valuation attract a greater number of complementors (Wang et al., 2023). But also, we see a negative correlation between *valuation* and *complementor size*, indicating the presence of negative network externalities or strategic tradeoffs in platform growth. Obviously, these raw correlations need to be interpreted with caution because of the confounding effects of multiple variables that we will disentangle using multivariate regression analyses.

----------INSERT TABLE 4 ABOUT HERE----------

[12] Note that we select the startups founded between 2012 and 2022 and headquarter in Europe just to get a rough reference for the startup distribution by industry. Our actual sample has all the startups that have raised funding on the ECF platforms in our sample between 2012-2022.

[13] We also notice an underrepresentation of the IT startups in ECF platforms. It might be driven by the newness of the ECF phenomenon and the availability of funding for IT firms elsewhere (Eldridge et al., 2021).

Main Results

We run multiple OLS regression models with fixed effects on the platform-quarter panel data set. Using the partnership variable identified in the textual analysis, we run our models to predict complementor entries on a platform. The fact that our data set has both sets of platforms, those that engaged in partnerships and those that did not, allows us to estimate the ordinary least squares (OLS) coefficients with high accuracy without using the Heckman selection model (Wolfolds & Siegel, 2019).

In Table 5, we report the OLS regression results of the effect of *partnerships* on *complementor entry*. Models (1) and (2) report results that only include control variables. The control model with fixed effects, i.e., Model (2), shows a positive effect of *valuation* (in logs) on *complementor entry* on the platform ($\beta = 0.61$, $p < 0.001$), indicating that the quarters with startups with greater valuation on average positively attract a greater number of *complementor entries* on the platform.

----------INSERT TABLE 5 ABOUT HERE----------

Model (3) includes our explanatory variable, i.e., *partnership*, to test hypothesis H1a. We find significant evidence that *partnerships* positively affect *complementor entries* to the platform ($\beta = 1.71$, $p < 0.001$). In our model, both the dependent variable and the independent variable of interest are in logarithmic units. This allows us to interpret the coefficients as the elasticities. We find that an increase of 1% in the number of *partnerships* of a platform increases the number of *complementor entries* by 1.71%.

----------INSERT FIGURE 3 ABOUT HERE----------

In Model (4), we test for the interaction effect of *partnership* and *platform diversification* on *complementor entry*. We find a significant support for our hypothesis H1b ($\beta = 2.05$, $p = 0.03$). Specifically, we show that the effect of *partnerships* in increasing the

number of *complementor entries* is greater for diversified platforms as compared to specialist platforms. Figure 3 plots the effect of *partnerships* on *complementor entries* for specialist platforms and diversified platform.[14] While we observe that an increase in *partnerships* increases the number of *complementor entries* for diversified platform, we also note that for specialist platforms the increase is only minimally positive to non-significant.

----------INSERT TABLE 6 ABOUT HERE----------

In our second set of analyses, we test the effect of *partnerships* on *complementor size*. The regression results are reported in Table 6. Models 1 and 2 show that platforms that attract startups with higher *valuation* attract startups with smaller *size*. Model 3 finds a weak albeit significant support for our hypothesis H2a ($\beta = -0.74$, $p = 0.08$). Finally, in Model 4 we test the interaction effect of *partnerships* and *platform diversity* on complementor size. We find significant support for our hypothesis H2b ($\beta = -6.01$, $p < 0.001$). Platform *partnerships* have a strong negative effect on *complementor size* on diversified platforms compared to their effect on *complementor size* on specialist platforms. We note that while the coefficient of the variable partnership is negative in Model 3, it becomes positive in Model 4.[15] This means that when *platform diversification* is 0, i.e., for specialist platforms, *partnerships* affect *complementor size* positively, and when *platform diversification* is 1, i.e., for diversified platforms, *partnerships* affect *complementor size* negatively. Figure 4 also highlights the difference in the effect of *partnerships on complementor size* for diversified and specialist platforms.

----------INSERT FIGURE 4 ABOUT HERE----------

[14] For specialist platforms, our variable *platform diversification* is 0 and, for diversified platforms, *platform diversification* is 1.

[15] Obviously, the results in Table 6 Model 4 should be interpreted with caution as the overall beta of the variable *partnership* is captured by both the main variable and the interaction variable.

Supplementary Analyses and Robustness Tests

Testing alternative explanations

To ensure the robustness and reliability of our main findings, we conduct a series of supplementary analyses and robustness checks. First, we conduct a test to account for the *reliability of the independent variable*. In our main analyses, we use *partnerships* as a continuous variable, following previous research in management (e.g., Park et al., 2004). In Appendix Table B1, we present the analyses using the *partnership* as a binary variable, capturing whether a platform engaged in partnerships in a quarter. The results are largely supported, indicating that *partnerships* of a platform positively affect *complementor entry* but lower *complementor size.*

Second**,** the ECF platforms make money by charging the startups a fixed fee on the total funds raised by the campaign. Therefore, the total of funds raised by all campaigns on a platform at a given time is directly proportional to the revenue generated by the platform. We test whether the *partnerships* affect the sums raised on a platform. The regression results presented in Appendix Table B2 show that the partnerships increase the overall funds raised on platform, and this effect is stronger for diversified platforms as compared to specialist platforms. This result is consistent with our arguments that partnerships can increase the attractiveness and performance of the platform in the short term.

Third, in our sample we have platforms headquartered in *12 different European countries*, and some of these countries have a more advanced entrepreneurial ecosystem than others that may bias the results. (Fraser et al., 2015). In our data, we found that the UK, Italy and Spain have the largest number of equity crowdfunding platforms in Europe. Hence, in Appendix Table B3, we show a sub-sample analysis of only the platforms that are headquartered in these three countries. The results are robust.

Fourth, we test whether *partnerships are effective in attracting new complementors* and/or repeat complementors. That is, while in our main tests we consider the entry of both new complementors and the existing complementors who have already raised funding on the funding as same, in this test we make a distinction especially to understand whether partnerships are effective in attracting new complementors to the platform. Using a fuzzy set matching of the startup names, we find that, in our data set, 439 campaigns were funded by the startups that already have experience with crowdfunding, and 31 of which actually funded their campaigns on the rival platforms. We find that *partnerships* are effective in attracting both new and existing complementor (Appendix Table B4). Furthermore, while the *diversification* of a platform positively moderates the relationship *partnerships* and new complementor entry, although non-significant partnerships of a diversified platform may reduce the number of entries by existing complementors.

Testing potential endogeneity issues

Finally, our data might also have *endogeneity* issues. Specifically, the platforms might engage in partnerships in the quarter they expect to receive a greater number of campaigns, creating a possible reverse causality explanation. In our main analyses, we account for this by lagging the partnership variable to explain the number and size of complementors in a quarter which partially accounts for the reverse causality. However, we also run an instrumental regression to support our results. Specifically, we choose a variable could affect the propensity of a platform to engage in partnerships without directly affecting the entry of complementors on a platform. This instrument can be used to model our independent variable, i.e., *partnership*, in the first stage and use the modeled variable to test our hypotheses in the second stage.

To model our partnership variable in the first stage, we use the number of local service providers founded in the city of the headquarter of the platform in a quarter. Pitchbook defines

and captures the variable "service providers" as a firm that provide any kind of services to the startups – i.e., complementors in our case. We argue that the number of local service providers, that is the service providers that locate in the same city as the headquarter of the platform, might affect the platform *partnerships* without directly affecting the *entry* and *size* of complementors on a platform. Platforms might engage in a greater number of partnerships when the platform HQ has a greater number of service providers, but since the complementors entering the platform are not specially locally based, we might not expect the number of potential service providers to directly affect the number of complementor entries on the platform. We collect further data on the potential SPs of a platform from the Pitchbook database.[16] The more the number of service providers the more the potential partners of the platform. We take a log of the variable and lag it by one quarter to account for the effect of the number of service providers at time t-1 on the partnerships at time t. Because of this added lag operation in the first stage, we lose one additional observation in our analyses.

We report that the Cragg–Donald Wald F statistic of our model is 17.85, which is higher than the critical benchmark of 16.38 for a 10% significance level (the most restrictive value; Stock & Yogo, 2005), indicating that our instruments can be considered sufficiently relevant. Appendix Tables B5 and B6 present the first and second stage of the regressions, respectively. The results of the two-stage least square (2SLS) regression are consistent with our hypotheses. This endogeneity test using an IV regression to test the effect of partnerships on the attractiveness of a platform for the complementors helps us to at least partially address the endogeneity concerns such as reverse causality.

[16] Pitchbook identifies service providers (SPs) as a category of market actors such as advertising agencies, consulting firms, and accounting firms that are operating in the entrepreneurial financing ecosystem. These market actors could be potential partners of the platform.

DISCUSSION

This study set out to explore how and when the resources that a platform provides to its complementors through external partners can affect the growth of the platform. Understanding the growth of the platform is important because platforms face a fundamental conundrum. On the one hand, sharing resources through partnerships can have various benefits for the platform (see Engert et al., 2022). For example, partners can provide valuable resources that are difficult to develop inhouse (Miotti & Sachwald, 2003) and help platforms address the heterogeneous needs of complementors (Rietveld et al., 2019). The shared resources between the platform and the partners can make the platform more appealing to complementors (Lan et al., 2019). Yet on the other hand, partnerships can also introduce negative externalities such as 'free riding' behavior (Cennamo & Santaló, 2019) and the rising gap between the bargaining powers of complementors and the platform owner (Wang & Miller, 2020), that may limit the growth of the platforms.

Platforms can grow by not only increasing the number of complementors (complementor base) but also their size. However, platforms face several strategic tradeoffs in their growth (Cennamo & Santaló, 2013). Our analyses reveal that platform partnerships positively affect the number of complementors entering the platform and negatively affect the size of complementors. Furthermore, we find that the strategic tradeoff is more salient in diversified platforms as compared to specialist platforms. Partnerships of diversified platforms are more effective in attracting a greater number of complementors but also more detrimental to complementor size.

Contributions to Conversations on Platform Ecosystems

Our findings allow us to contribute to the literature on the platform ecosystem. First, we add to the literature on platform attractiveness for complementors. While the literature has

focused on the use of a platform's own resources to attract complementors (for a review, see Chen et al., 2022), we show that a platform can also develop resources shared with the partners to increase its attractiveness. Specifically, we show that platforms use partnerships with SPs to increase their attractiveness to complementors (Cutolo et al., 2022). Using external collaborations as a source of resources (Arya & Lin, 2007; Mitchell & Singh, 1996) has a long standing in the strategy literature.

Previous research in management (e.g., Park et al., 2004), using a sample of e-commerce firms (when the industry was nascent) and their alliances (equity-based partnerships) found that strategic alliances increase firm growth. However, the partnerships of today's firm are increasingly non-equity based. Furthermore, the increasingly popular business model, i.e., platform, has a unique design, as they also have complementors as its users and the services provided by the platform are cocreated services by complementors and platform. Using a more longitudinal sample and an evolutionary perspective of equity crowdfunding platforms and their partnerships (non-equity), we find that the relationship between partnerships and growth has important tradeoffs. Hence, the results of this study offer a more contemporary view of the 'alliances' of firms like platforms. In this respect, our results advance prior studies on the effect of a platform's strategic partnerships on its competitive advantage (e.g., Armstrong & Wright, 2007; Ceccagnoli et al., 2012; Engert et al., 2022), user growth (e.g., West & Wood, 2014), legitimacy (e.g., Taeuscher & Rothe, 2020) and innovation (e.g., Hilbolling et al., 2020).

Further literature can develop on our findings about the platform partnerships, to explore the effect of platform characteristics on the choice and performance of partnerships (Colombo et al., 2006). Building on our findings about how to attract complementors, future research can examine the effect of partnerships on platform strategic decisions such as envelope (Eisenmann et al., 2011) and entry into complementor space (Kang & Suarez, 2023).

Furthermore, the gaps remain in our understanding of the effect of platform partnerships on complementor innovation incentives and performance.

Contributions to Conversations on Crowdfunding Platforms

We also add to the literature on crowdfunding platforms. While prior literature has focused primarily on the crowdfunding platform's own resources and network base to attract complementors (Rietveld et al., 2021), we highlight the effect of external resources, i.e., partners to attract complementors to the platform. We specifically examine those partnerships that are non-equity collaborations between a platform and an SP to share resources for mutual benefits (Reuer & Devarakonda, 2016). Prior research has devoted scant attention to these collaborations, despite their relevance, partly due to the difficulties in obtaining the granular level data needed to examine them (Frame & White, 2004).

Our findings about the equity crowdfunding platform are novel in that they focus on the effect of platform strategies, as complementary to the research on complementor strategies (Cong & Xiao, 2024; Wessel et al., 2021), in explaining complementors' incentives to join a platform and the total amount of funds raised by complementors on the platform. Building on these insights, future research on equity crowdfunding can further explore the social impact of the platforms that have SPs and the resources that they can provide (e.g., Logue & Grimes, 2022), and the effect that new regulations may have in the new collaborations formed by the platforms and complementors alike (Meggiorin & Moschieri, 2024).

Finally, this study offers novel practical insights into the functioning of crowdfunding platforms. We highlight that ECF platforms try to simulate a VC-like ecosystem through partnerships with SPs (Assenova et al., 2016). We use a multi-platform sample to highlight that by engaging in such partnerships, a platform can gain a competitive advantage and attract

complementors. We call for more research on the drivers and consequences of the resources shared by a platform through strategic partnerships.

Practical Implications

Our study has several practical and policy implications. First, our results primarily inform the owners of equity crowdfunding platforms. It offers a practical guide on managing the relationship with the partnerships and the consequences of such decisions. In light of our results, ECF platforms may decide whether and when they may want to engage in strategic partnerships. We also highlight for what kind of platforms partnerships might be an effective strategy to promote growth.

Second, we also have important findings for the service providers and the consequences of their decision to partner with a platform. Recent studies have advanced our understanding of the dynamics of firm-government partnerships (Liang & Liu, 2018; Nishimura & Okamuro, 2011). There is still a gap in understanding how governments coordinate with platforms that promote network externalities, deteriorating the competitive ecosystem. In our context, we observe that governments engage in partnerships with equity crowdfunding platforms to fund the next generation of complementors. We show that such partnerships might have unintended consequences as well. Specifically, partnerships may not benefit the intended complementors but may get misused by opportunity-seeking platforms and complementors. We call for more research to understand the effect of partnerships on complementors and their behavior.

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TABLES AND FIGURES

Figure 1. Hypotheses Skeleton Diagram

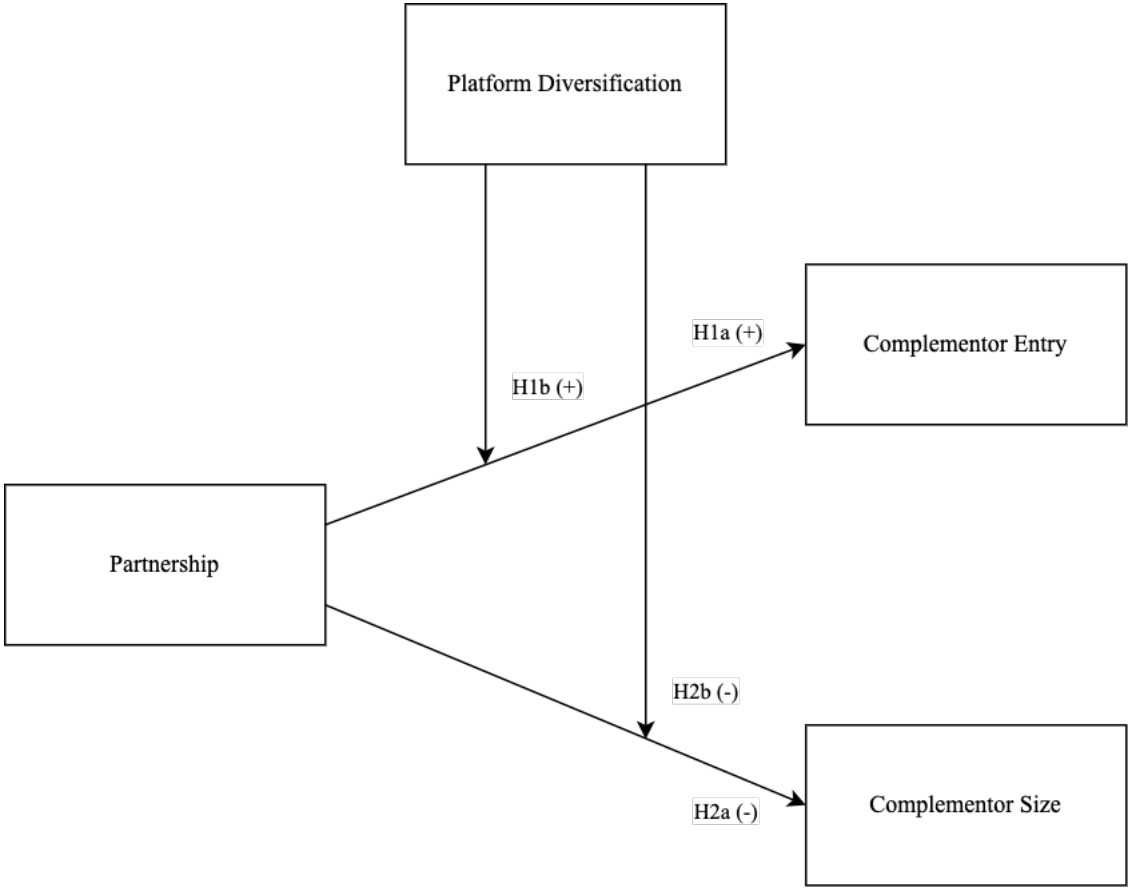
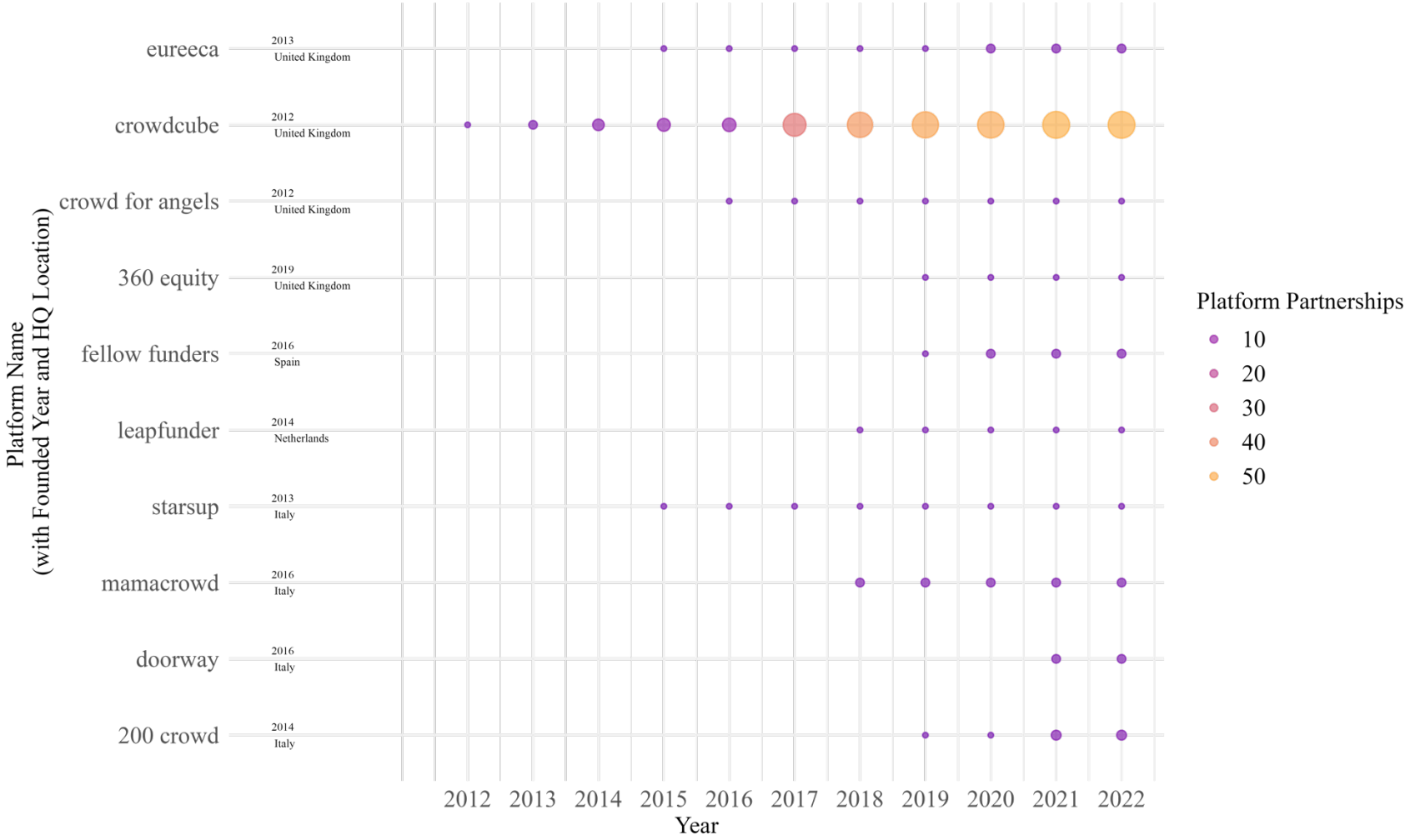
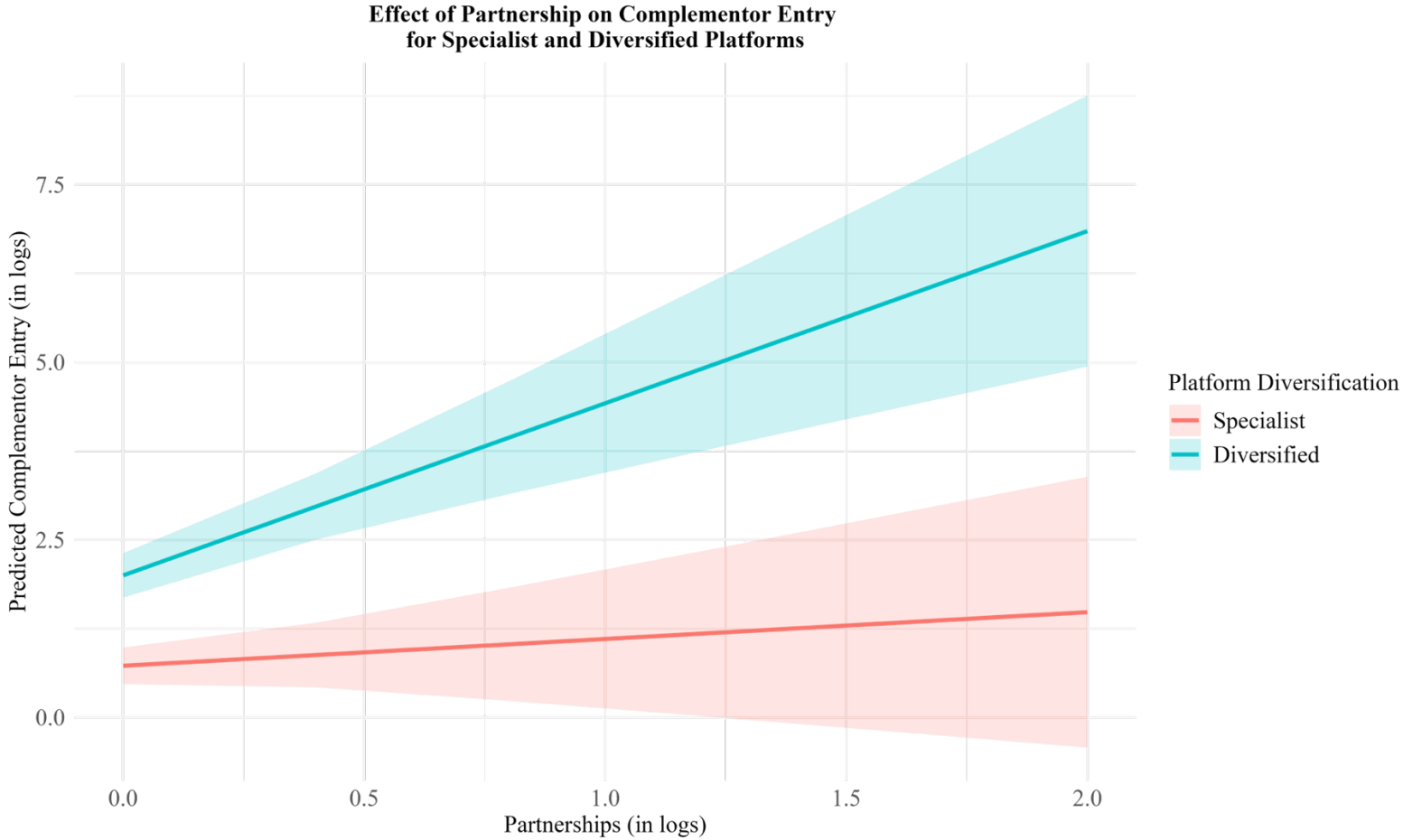


Figure 2. Timeline of Platform Founded Year and Partnership



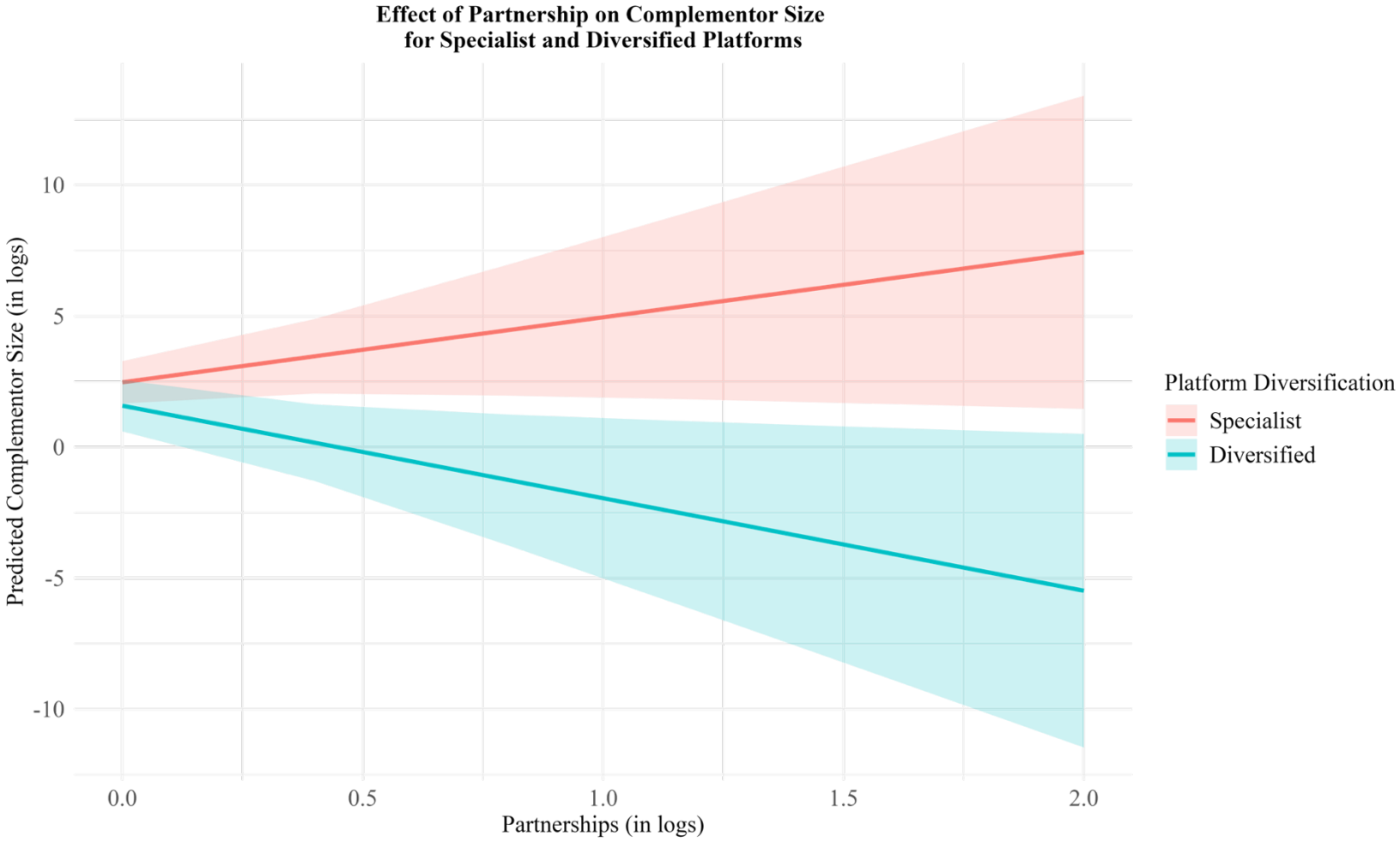
Note: the graph exludes the platforms that are in sample but did not enagge in partnerships over our sample period.

Figure 3. Interaction Effect of Partnership and Platform Diversification on Complementor Entry



Note. The graph is plotted with confidence interval of 90%.

Figure 4. Interaction Effect of Partnership and Platform Diversification on Complementor Size



Note. The graph is plotted with confidence interval of 90%.

Table 1. Sample Selection and Filtering Process

Step in Sample Selection and Filtering	Filter Description	Number of Platforms
1. Initial Hits	Number of potential platforms with headquarters in Europe identified through Pitchbook (PB)	380
2. ≥ 5 campaigns	Platforms with at least 5 campaigns from the year 2012 to 2022	81
3. Free Matching	Platforms that allow 'free matching' between complementors and users (removing the platforms that operate on syndication crowdfunding model)	67
4. Equity Focus (ECF)	Platforms with a focus on the 'equity' type of crowdfunding (ECF)	37
5. Platforms without missing data	Platforms without missing data	32
Final number of ECF platforms included in the sample		32

Table 2. Description of the Variables

Variable	Definition	Primary Data Source(s)
Complementor Entry	The total number of campaigns funded in a quarter on a platform (in logs)	Platform Website
Complementor Size	The amount of funds raised in an average campaign in a quarter on a platform (in logs)	Platform Website
Partnership	The number of partnerships made by a platform in a quarter (in logs)	Platform Website
Platform Diversification	One minus Herfindahl index (HHI), measuring the sum of the squares of the market share of each sector, based on the amount of funds raised by campaigns in a quarter on a platform.	Pitchbook, Platform Website
Internal Resources	A binary variable capturing whether a platform provides services to complementors using internal resources.	Platform Website
Equity Issued	The average of the equity percentage issued by the startups on the ECF platform in a quarter (in log).	Platform Website
Complementor Valuation	The average of the valuation of the startups fundraising on the ECF platform in a quarter (in log).	Platform Website
Complementor Age	The average of the age of startups fundraising on the ECF platform in a quarter (in years).	Pitchbook, Crunchbase
Platform Fundraising Events	The cumulative number of fundraising, M&A, and IPO related events made by the platform up to a quarter.	Pitchbook
Platform Age	The count variable captures the age of a platform (in years).	Pitchbook

Table 3. Distribution of all the Crowdfunding Campaigns in our Sample by Industry from 2012 to 2022.

	Primary Industry Sector	Number of Campaigns (our Sample)	Percentage of Campaigns (our Sample)	Percentage of Startups (in all Europe)
1	Business Products and Services (B2B)	388	11.94	17.27
2	Consumer Products and Services (B2C)	1454	44.74	23.34
3	Energy	126	3.88	1.79
4	Financial Services	110	3.38	2.59
5	Healthcare	249	7.66	12.09
6	Information Technology	795	24.46	41.02
7	Materials and Resources	128	3.94	1.88

Table 4. Descriptives and Correlation Table

	Variable	Mean	SD	Min	Max	1	2	3	4	5	6	7	8	9
1	Complementor Entry	4.99	3.3	0	11.47									
2	Complementor Size	2.27	2.17	0	8.94	0.42*								
3	Partnership	0.03	0.13	0	1.33	0.22*	-0.09*							
4	Platform Diversification	0.21	0.26	0	1	0.45*	-0.16*	0.20*						
5	Internal Resources	0.44	0.5	0	1	-0.01	-0.10*	0.17*	-0.02					
6	Equity Issued	1.52	1.36	0	4.5	0.32*	-0.03	0.13*	0.46*	0.03				
7	Complementor Valuation	0.92	0.97	0	7.17	0.36*	-0.07*	0.19*	0.49*	0.12*	0.65*			
8	Complementor Age	3.43	5.73	0	87	0.13*	0.01	0.03	0.25*	-0.03	0.28*	0.31*		
9	Platform Fundraising Events	1.58	2.08	0	9	0.26*	-0.02	0.16*	0.24*	0.12*	0.05	0.20*	0.12*	
10	Platform Age	3.41	2.54	0	10	0.21*	-0.04	0.07*	0.22*	-0.07*	0.15*	0.27*	0.13*	0.50*

*Correlations are significant at $p < .10$.

Table 5. Effect of Partnerships and Platform Diversification on **Complementor Entry**

	Dependent Variable = *Complementor Entry*			
	(1)	(2)	(3)	(4)
Partnership (H1a)			1.71***	0.38
			(0.24)	(0.60)
Partnerships × Platform Diversification (H2a)				2.05**
				(0.97)
Platform Diversification				1.27***
				(0.13)
Internal Resources	-0.47**	0.36	0.10	0.09
	(0.22)	(0.34)	(0.08)	(0.07)
Equity Issued	0.42***	0.35***	0.09***	0.02
	(0.1)	(0.11)	(0.03)	(0.03)
Complementor Valuation	0.75***	0.61***	0.21***	0.11**
	(0.16)	(0.17)	(0.05)	(0.04)
Complementor Age	-0.01	-0.01	-0.01*	-0.01**
	(0.01)	(0.01)	(0.001)	(0.001)
Platform Fundraising Events	0.33***	0.44***	0.10***	0.09***
	(0.05)	(0.08)	(0.02)	(0.02)
Platform Age	0.02	0.10	0.07***	0.06***
	(0.05)	(0.10)	(0.02)	(0.02)
Constant	3.31***	3.15***	0.89***	0.64**
	(0.22)	(0.95)	(0.22)	(0.27)
Platform Country FEs	No	Yes	Yes	Yes
Time FEs	No	Yes	Yes	Yes
Clustered Standard Errors	Yes	Yes	Yes	Yes
Number of Observations	815	815	815	815

Note: Standard errors are in parentheses. ***p < 0.01; **p < 0.05; *p < 0.1.

Table 6. Effect of Partnerships and Platform Diversification on **Complementor Size**

	Dependent Variable = *Complementor Size*			
	(1)	(2)	(3)	(4)
Partnership (H2a)			-0.75*	2.48*
			(0.43)	(1.34)
Partnership × Platform Diversification (H2b)				-6.01***
				(2.19)
Platform Diversification				-0.89***
				(0.32)
Internal Resources	-0.44***	-0.26	-0.24	-0.23
	(0.16)	(0.24)	(0.25)	(0.25)
Equity Issued	0.02	-0.01	-0.01	0.03
	(0.08)	(0.08)	(0.08)	(0.08)
Complementor Valuation	-0.15	-0.23*	-0.21*	-0.12
	(0.11)	(0.12)	(0.12)	(0.11)
Complementor Age	0.01	0.01	0.01	0.01
	(0.01)	(0.01)	(0.01)	(0.01)
Platform Fundraising Events	0.02	0.14**	0.14**	0.14**
	(0.04)	(0.06)	(0.06)	(0.06)
Platform Age	-0.04	-0.14**	-0.13*	-0.11*
	(0.04)	(0.07)	(0.07)	(0.07)
Constant	2.63***	1.24***	1.23***	1.35***
	(0.17)	(0.42)	(0.42)	(0.43)
Platform Country FEs	No	Yes	Yes	Yes
Time FEs	No	Yes	Yes	Yes
Clustered Standard Errors	Yes	Yes	Yes	Yes
Number of Observations	815	815	815	815

Note: Standard errors are in parentheses. ***p < 0.01; **p < 0.05; *p < 0.1.

APPENDIX A

TABLE A1. An Overview of Equity Crowdfunding Platforms in the Sample

Platform	Founded Year	Platform HQ	Geographic focus
1. 200 Crowd	2014	Italy	Italy
2. 360 Equity	2018	UK	UK
3. Adventurees	2016	Spain	Spain
4. Back to Work	2012	Italy	Italy
5. Beesfund	2012	Poland	Poland
6. Companisto	2012	Germany	Austria, Germany, Switzerland
7. Crowd for Angels	1995	UK	Canada, Finland, UK
8. Crowdconnect	2021	Poland	Poland
9. Crowdcube	2011	UK	Australia, Belgium, Denmark, France, Germany, Ireland, Latvia, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, UK, USA
10. Crowdfunding Bizkaia	2017	Spain	Spain
11. Crowdfundme	2015	Italy	Italy
12. Doorway	2016	Italy	Italy
13. Ethex	2011	UK	UK
14. Eureeca	2013	UK	Jordan, Kenya, Malaysia, Netherlands, United Arab Emirates, UK
15. Fellow Funders	2016	Spain	Spain
16. Folkeinvest	2015	Norway	Norway
17. Growth Ventures	2013	UK	UK
18. Growthdeck	2015	UK	Spain, UK
19. Happy Capital	2013	France	France
20. La Bolsa Social	2015	Spain	Spain
21. Leapfunder	2014	Netherlands	Germany, Netherlands
22. Lita	2015	France	France
23. Mamacrowd	2016	Italy	Italy
24. Opstart	2015	Italy	Italy
25. Seedblink	2020	Romania	Australia, Austria, Bulgaria, Estonia, Germany, Greece, Italy, Latvia, Luxembourg, Netherlands, Romania, Switzerland, UK, USA
26. Shadow Foundr	2015	UK	UK
27. Socios Inversores	2011	Spain	Spain
28. Spark Crowdfunding	2018	Ireland	Ireland
29. Spreds	2011	Belgium	Belgium, France, Netherlands
30. Starsup	2013	Italy	Italy
31. Tokeportal	2017	Hungary	Hungary
32. We are Starting	2014	Italy	Italy

TABLE A2. Top 15 Topics Identified with Word Embedded Topic Model

Topic 1: Workshops and Events	Topic 6: Work Culture and Environment	Topic 11: Sports and Entertainment Indusrty
edition, organized, speakers, siamosoci, workshop, confindustria	wasnt, me, mindforyou, anxiety, wouldnt, ive, weve, feel	footballer, football, sportclubby, clubs, sports, athletes
bocconi, masserdotti, milan, wearestarting, hundred, appointment	myself, my, dementia, thought, hightechxl, didnt, feeling	esports, fidelityhouse, advertising, fitsharing, amateur, gaming
bergamo, palazzo, trentino, matteo, innova, entitled, event	really, got, amazing, gripit, thats, theres, loved, oh, fun	docety, sport, gamers, entertainment, gym, sporting, users
trento, spaceup, giudici, lazio, jury, conference, bolzano	cubers, love, watching, wanted, we, enjoyable, yoga, youve	games, gyms, trainers, proprietary, samsung, players, athlete
chamber, padua, exhibition, calabiana, afternoon, udine	someone, myrthe, couldnt, living, did, celebrities, knew, felt	player, fantasy, editorial, fans, fitness, tv, nike, yoga
dedicated, cagliari, pcup, rimini, rome, startupitalia, cresco	like, mother, something, friend, get, doing, skinny, wed	serie, training, videos, league, trainer, views, kippy, apps
held, banco, networking, bys, venezia, friuli, florence, pm	theyre, us	blinkoo, user, publishers, content, advertisers, viewer, coaches
alfonsino, brescia, kelony		youtube
Topic 2: Pitch Desk	**Topic 7: Technology and Software**	**Topic 12: Partnership**
sure, your, youll, tips, dont, pitch, concise, slide, youre	processes, data, predictive, management, cyber, idc, profiles	accelerator, programme, mentorship, mentors, mentoring, thornton
remember, deck, youve, keep, yourself, proposition, ask, slides	requested, earns, computing, automation, digitization, analytics	cohort, coaching, crowdboost, introductions, incubation
audience, dos, compelling, you, emails, need, whether, should	intelligence, security, transversal, cloud, complex	corporates, alumni, network, programmes, abn, amro, hightechxl
messages, impression, elevator, doesnt, try, understand	transformation, trends, technological, skills, artificial	innovators, program, ukri, innovate, entrepreneurs, partners
communicating, key, communicate, get, asking, writing, someone	internal, machine, productivity, fundamental, remote, algorithms	shine, support, bespoke, gcv, workshops, spaceup, maven, philips
going, chances, informative, reader, right, audiences, when	connectivity, analysis, capable, human, gartner, intelligent	sbc, teams, labs, networking, hub, programs, invaluable
look, if, narrative, financials, message	errors, processing, computer, systems, increasingly, crm	rockstart, antler, ideas, vibrant, sessions, startupbootcamp
	definition, infrastructures, threats, remotely, attacks	access, thrive, connections, experts, virgin
	organizational, applications, agility, does	
Topic 3: Success Stories	**Topic 8: Stocks and Bonds Market**	**Topic 13: Blockchain and Cryptocurrency Industry**
beauhurst, deals, record, megadeals, monzo, freetrade, revolut	rfk, extramot, minibond, modefinance, ellemme, borsa, euronext	tokens, crypto, token, decentralised, ethereum, cryptocurrency
quarter, saw, pitchbook, challenger, rounds, raises, seen	italiana, minibonds, mdi, keelt, coupon, rating, placement	blockchain, cudos, bitcoin, ledger, nfts, defi, dlt, blockchains
gohenry, continued, balderton, surge, uks, vc, standout, bn	subsidiaries, crowdlisting, listing, listed, preparatory	currency, ico, currencies, icos, decentralized, exchanges
despite, breaking, valuations, fintech, number, firms, backed	alfonsino, spa, duration, microcredit, affari, deferred	bitcoins, fiat, stablecoins, centralised, metaverse, compute
accounted, unicorn, landmark, trend, staggering, burgeoning	trendevice, esma, subscribed, capitalization, piazza, baldissera	cudo, coins, nft, fungible, transactions, cryptoassets, computing
pledged, overseas, uncertainty, decade, sequoia, raised, increase	repayment, maturity, tommaso, issuer, stock, cleanbnb	layer, dao, tokenised, computational, coin, crowdforangels
flowing, businesses, recorded, funding, quarters, records	subscriptions, unsecured, envisaged, yield, exceeding	wallets, holders, nodes, adoption, distributed, unregulated
growing, camden	crowdinvesting, gtv, concluded, nike, massimiliano, instruments	utility, encryption, fca, facebooks, regulated
	ebitda, solidity	
Topic 4: Financing Ecossytem	**Topic 9: Government Incentive Schemes**	**Topic 14: Tax Deductions and Declarations**
dutch, netherlands, hightechxl, amsterdam, xxl, youre, mentors	eis, seis, cgt, relief, reliefs, gains, scheme, generous	decree, taxable, concessions, deduct, deduction, isf, ir
learned, corporates, ecosystem, startupbootcamp, lot, rotterdam	schemes, tax, inheritance, defer, reinvestment, income, deferral	exemption, regime, taxpayer, tax, persons, paragraph, legislator
gtec, shaping, utrecht, sbc, antler, abn, delft, whats, amro	hmrc, minimising, liable, exempt, iht, qualify, claimed, claim	subject, provisions, smes, deducted, pme, taxation, taxpayers
tell, attracts, rockstart, thing, philips, scene, me, founders	vcts, exemption, enterprise, eligible, allowance, bpr, qualifying	mise, deductions, relaunch, legislation, ceiling, quotas, amount
mentorship, ideas, ive, endeavours, entrepreneurs, berlins	claiming, bill, maximising, minimise, eligibility, offset	beneficiary, incentives, facition, subjects, reduction
amazing, background, hague, learnings, get, changemakers, thank	chancellor, though, loss, gain, routes, liabilities, vct	legislative, envisaged, declaration, law, exempt, breaks
accelerator, techstars, really, berlin, youve, eindhoven	liability, taxpayers, wrapper, reinvest, taxpayer, sunak, dispose	regulation, taxes, must, consob, maximum, limit, pea, gains
definitely		incentive, granting, possession
Topic 5: Political Context	**Topic 10: Economy Sentiments**	**Topic 15: Crowdfunding Types**
headlines, trillion, political, tensions, sovereign, putin	inaddition, false, scoring, however, sri, truth, likewise	convertibles, convertible, dilution, valuation, usually, clauses
possibly, trump, lets, scary, donald, charts, brexit, truth	suddenly, nash, liver, transplant, banks, downturn, dicartech	loan, repay, liquidation, shares, repaid, shareholders, happens
irelands, arguably, sadly, fed, chaos, inflationary, yep, chart	existed, putin, biopsy, probably, nashmir, unfortunately	negotiate, leaver, note, qualifying, debt, cap, often, repayment
robinhood, geopolitical, biden, highs, wont, didnt, ukraine	robinhood, kidney, optimism, fear, weapons, indeed, incumbent	if, outset, conversion, clause, option, normally, rounds, rights
irish, gop, destruction, irrespective, illustration, collapse	esg, equities, trump, captain, europeans, wisdom, rational	common, drag, converted, lets, sometimes, money, loans
wars, whopping, voters, russian, fears, theres, inflation	irrespective, entreprises, recession, wrong, icon, disappear	generally, certain, preference, agree, percentage, typically
threat, boris, recession, suggest, thought, imf, bluntly, rather	riskier, valuations, williams, argue, gdp, lending, oh	likely, cash, options, collateral, when, agreed, bad, tag
	infection, brexit, charts	

TABLE A3. Top Five Topics Related to the Word 'Partnership' and their Cosine Similarity Score

Topic Index	Keywords	Cosine Similarity
1	chayoras, chayora, colocation, tianjin, hyperscale, campuses, telstra, centre, shanghai, beijing, campus, mw, oliver, actis, jones, china, tier, carrier, connectivity, constructed, metropon, chinese, chinas, wholesale, hong, holdings, executive, idc, hectare, chief, delighted, kong, officer, kirk, domestic, wireie, international, cloud, infrastructure, operator, developer, centres, northern, leo, accommodate, operational, provinces, strategically, fissara, serve	0.23
2	accelerator, programme, mentorship, mentors, mentoring, thornton, cohort, coaching, crowdboost, introductions, incubation, corporates, alumni, network, programmes, abn, amro, hightechxl, innovators, program, ukri, innovate, entrepreneurs, partners, shine, support, bespoke, gcv, workshops, spaceup, maven, philips, sbc, teams, labs, networking, hub, programs, invaluable, rockstart, antler, ideas, vibrant, sessions, startupbootcamp, access, thrive, connections, experts, virgin	0.22
3	awards, shortlisted, winners, finalists, judges, category, keynes, milton, judging, winner, award, nominated, fourex, categories, ceremony, showcasing, fantastic, finalist, mk, funded, won, ukbaa, birthday, proud, winning, celebrating, lovespace, altfi, prestigious, justpark, jury, awarded, celebrate, pip, visualsoft, sugru, kelda, cast, delighted, testament, voted, fundedclub, exciting, favourite, announce, ian, journeys, gary, uks, businesses	0.20
4	itpa, plensat, bitz, soulskill, myrthe, nika, hug, civocracy, rutger, tienko, refundme, deko, coming, adeezy, obob, friday, flowpilot, stampwallet, readiness, gearbooker, session, ticketing, soon, hurm, bundleboon, rabobank, overweight, amsterdam, tuned, visit, delays, gtec, learn, obesity, festivals, freelance, veterinary, treating, hero, round, andrea, berlin, eko, organizers, seamless, pet, backbone, table, delft, holland	0.18
5	midlands, levelling, east, regional, north, uks, leeds, regions, england, west, british, birmingham, manchester, london, uk, northern, powerhouse, chancellor, south, scotland, region, government, wales, sunak, housebuilders, britain, innovate, ukri, cbils, governments, businesses, grants, beauhurst, glasgow, housebuilding, sitr, emphasis, postcode, britains, countrys, schemes, scaleups, hub, megadeals, deals, highlights, across, local, fund, programme	0.17

TABLE A4. Top Five Documents in the Partnership Topic

Platform	Blog Post	Cosine Similarity
Crowdcube	Crowdcube teams up with Telefnicas Wayra. Crowdcube is thrilled to announce a new partnership with Wayra UK that creates an exciting platform for startups and entrepreneurs to access a wealth of knowledge, coaching and venture opportunities to take their fast-growth companies to the next level.	0.70
Crowdcube	Co-working & Accelerators. We work with a number of co-working & accelerator partners across the UK to help support revolutionary entrepreneurs raise finance through equity crowdfunding. Through this partnership, our co-working & accelerator partners gain access to: A fast track access point to their members In-depth crowdfunding workshops, 121 drop-in sessions and more bespoke programmes Thought leadership content on the blog to shout about the programme or space Our partners are rock stars because of the great offer they can give their community whilst helping their members access capital & build their community. Its great for us here at too, as the quality of the businesses is so high. Do you want to hear more? We are actively looking for more co-working and accelerator partners across the UK, so please do get in touch. Heres what Jonathon Spanos, Head of Innovation for Virgin StartUp, has to say about the benefits of partnering with us: Giving the entrepreneurs in our network greater insights into funding options compliments our commitment to support their growth journey beyond early stage, but also through scale-up and acquisition. If you are interested, please complete our online form.	0.70
Crowdcube	Ready. Fund. Grow.. Crowdfunding is an exciting way to raise capital for your business. Our partner, G by Grant Thornton, has developed the Crowdfunding Ready service. G brings together Grant Thorntons services for dynamic small businesses and through the Crowdfunding Ready service, G supports small business leaders to develop the perfect campaign page and ensure their investment opportunity stands out to the crowd. You can find out more about these regular events, which are held around the UK, here.	0.64
Crowdcube	Crowdcube strengthens ties with Worth Capital. Crowdcube are working with Worth Capital to help support, fund and grow their network of fantastic entrepreneurs on their journey to disrupt the landscape of their respective sector. Through this relationship, our equity coaches will support any Worth Capital introductions or alumni businesses, with hands-on venture workshops and fundraising guidance to successfully raise funds on the platform. This new partnership is in line with s vision of enabling early stage teams to access a wide range of investment opportunities. Worth Capital introductions will also receive a discount on our standard fundraising fee.	0.62
Shadow Foundr	Join the Autumn Cohort at the NatWest Entrepreneur Accelerator. is a big fan of The NatWest Accelerator, which is looking to support the entrepreneurs, innovators, and disrupters in Brighton and the wider Sussex area. There are only a few spaces left to join a cohort of ambitious start-ups on their next intake could you be one of them? What is the Accelerator? It is a 6-month programme designed to support you in growing and scaling your business to the next level. It comes with free desk space in our state-of-the-art co-working hubs, dedicated 1:1 coaching, access to specialist mentors and contacts, and a great community of like-minded founders to share your journey with. And its fully funded so theres no cost to you or your business. Have an idea but not quite sure where to start? NatWest also run a virtual 8-week Pre-Accelerator programme to help you get started. This programme takes you through lean start-up methods to ensure you validate your business idea and create a feasible and sustainable business model Apply here today: www.natwest.com/acceleratorApplications close: 26th August Hub Tours are available every month if you want to take a look around and find out more, click here. Please direct any enquiries to Brighton hub manager Kristina: kristina.pereckaite@natwest.com	0.62

Appendix B

Table B1. Robustness Check: Partnerships as a Binary Variable

	Complementor Entry		Complementor Size	
	(1)	(2)	(3)	(4)
Partnership (H1a and H2a)	1.01***	0.02	-0.30	1.75**
	(0.20)	(0.35)	(0.34)	(0.70)
Partnership × Platform		1.69***		-4.07***
Diversification (H1b and H2b)		(0.57)		(1.17)
Platform Diversification		1.27***		-0.89***
		(0.13)		(0.32)
Internal Resources	0.10	0.09	-0.25	-0.23
	(0.08)	(0.07)	(0.25)	(0.25)
Equity Issued	0.09***	0.02	-0.01	0.03
	(0.03)	(0.03)	(0.08)	(0.08)
Complementor Valuation	0.22***	0.11**	-0.22*	-0.12
	(0.05)	0.04)	(0.12)	(0.11)
Complementor Age	-0.01*	-0.01**	0.01	0.01
	(0.001)	(0.001)	(0.01)	(0.01)
Platform Fundraising Events	0.10***	0.1***	0.14**	0.14**
	(0.02)	(0.02)	(0.06)	(0.06)
Platform Age	0.07***	0.06***	-0.13**	-0.12*
	(0.02)	(0.02)	(0.07)	(0.07)
Constant	0.87***	0.64**	1.24***	1.34***
	(0.22)	(0.27)	(0.42)	(0.43)
Platform Country FEs	Yes	Yes	Yes	Yes
Time FEs	Yes	Yes	Yes	Yes
Clustered Standard Errors	Yes	Yes	Yes	Yes
Adjusted R^2	0.36	0.45	0.05	0.07
Number of Observations	815	815	815	815

Note: Standard errors are in parentheses. ***p < 0.01; **p < 0.05; *p < 0.1.

Table B2. Robustness Check: Dependent Variable is Total Raised (in logs)

	Dependent Variable = *Total Raised*	
	(1)	(2)
Partnership	4.12***	4.12**
	(0.58)	(1.72)
Partnership × Platform Diversification		-1.66
		(2.81)
Platform Diversification		3.42***
		(0.47)
Internal Resources	0.28	0.27
	(0.33)	(0.33)
Equity Issued	0.34***	0.15
	(0.11)	(0.11)
Complementor Valuation	0.51***	0.26
	(0.17)	(0.16)
Complementor Age	-0.01	-0.02
	(0.01)	(0.02)
Platform Fundraising Events	0.43***	0.41***
	(0.08)	(0.08)
Platform Age	0.04	0.02
	(0.09)	(0.09)
Constant	3.2***	2.46**
	(0.96)	(1.01)
Platform Country FEs	Yes	Yes
Time FEs	Yes	Yes
Clustered Standard Errors	Yes	Yes
Adjusted R^2	0.24	0.28
Number of Observations	815	815

Note: Standard errors are in parentheses. ***p < 0.01; **p < 0.05; *p < 0.1.

Table B3. Robustness Check: Platforms headquartered in the UK, Spain and Italy only

	Complementor Entry		Complementor Size	
	(1)	(2)	(3)	(4)
Partnership (H1a and H2a)	1.62***	0.48	-0.72	2.32*
	(0.25)	(0.62)	(0.44)	(1.35)
Partnership × Platform Diversification (H1b and H2b)		1.57		-5.58***
		(1.02)		(2.21)
Platform Diversification		1.63***		-1.13***
		(0.16)		(0.42)
Internal Resources	0.07	0.06	-0.24	-0.23
	(0.08)	(0.08)	(0.25)	(0.25)
Equity Issued	-0.01	-0.05*	0.05	0.08
	(0.03)	(0.03)	(0.10)	(0.10)
Complementor Valuation	0.40***	0.19***	-0.36***	-0.19
	(0.06)	(0.05)	(0.14)	(0.15)
Complementor Age	0.001	0.001	0.01	0.01
	(0.001)	(0.01)	(0.01)	(0.01)
Platform Fundraising Events	0.07***	0.08***	0.22***	0.21***
	(0.03)	(0.02)	(0.08)	(0.07)
Platform Age	0.08***	0.06***	-0.17**	-0.15**
	(0.03)	(0.02)	(0.07)	(0.07)
Constant	1.64***	1.11***	2.23***	2.44***
	(0.28)	(0.26)	(0.47)	(0.51)
Platform Country FEs	Yes	Yes	Yes	Yes
Time FEs	Yes	Yes	Yes	Yes
Clustered Standard Errors	Yes	Yes	Yes	Yes
Adjusted R^2	0.43	0.54	0.03	0.05
Number of Observations	531	531	531	531

Note: Standard errors are in parentheses. ***p < 0.01; **p < 0.05; *p < 0.1.

Table B4. Robustness Check: from New Complementors and Existing Complementors Entry

	New Complementor Entry		Existing Complementor Entry	
	(1)	(2)	(3)	(4)
Partnership (H1a and H2a)	1.68***	0.34	0.40***	0.54
	(0.23)	(0.58)	(0.12)	(0.41)
Partnership × Platform Diversification (H1b and H2b)		2.07**		-0.35
		(0.94)		(0.68)
Platform Diversification		1.22***		0.15**
		(0.13)		(0.07)
Internal Resources	0.09	0.08	0.03	0.03
	(0.08)	(0.07)	(0.04)	(0.04)
Equity Issued	0.07**	0.01	-0.01	-0.02
	(0.03)	(0.03)	(0.02)	(0.02)
Complementor Valuation	0.22***	0.12***	0.08***	0.07***
	(0.05)	(0.04)	(0.03)	(0.03)
Average Complementor Age	-0.01***	-0.01***	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Platform Fundraising Events	0.1***	0.1***	0.06***	0.06***
	(0.02)	(0.02)	(0.01)	(0.01)
Platform Age	0.05**	0.04*	0.001	0.001
	(0.02)	(0.02)	(0.01)	(0.01)
Constant	0.93***	0.70**	0.12	0.09
	(0.23)	(0.27)	(0.08)	(0.08)
Platform Country FEs	Yes	Yes	Yes	Yes
Time FEs	Yes	Yes	Yes	Yes
Clustered Standard Errors	Yes	Yes	Yes	Yes
Adjusted R^2	0.35	0.48	0.17	0.17
Number of Observations	815	815	815	815

Note: Standard errors are in parentheses. ***p < 0.01; **p < 0.05; *p < 0.1.

Table B5. Robustness Check: Instrument Variable Regression (First Stage)

	Dependent Variable = *Partnership*
	(1)
Number of Service Providers	0.02***
	(0.01)
Internal Resources	-0.01
	(0.01)
Equity Issued	0.001
	(0.001)
Complementor Valuation	0.02***
	(0.01)
Complementor Age	0.001
	(0.001)
Platform Fundraising Events	0.01
	(0.001)
Platform Age	0.01***
	(0.001)
Constant	0.001
	(0.04)
Platform Country FEs	Yes
Time FEs	Yes
Clustered Standard Errors	Yes
Adjusted R^2	0.12
Number of Observations	814

Note: Standard errors are in parentheses. ***p < 0.01; **p < 0.05; *p < 0.1. We lose one observation due to the lag of the instrument variable.

Table B6. Robustness Check: Instrument Variable Regression (Second Stage)

	Dependent Variable = *Complementor Entry* (1)	Dependent Variable = *Complementor Size* (2)
Partnership (H1a and H2a)	5.56***	-9.34*
	(1.94)	(4.98)
Internal Resources	0.02	-0.06
	(0.09)	(0.3)
Equity Issued	0.08***	0.02
	(0.03)	(0.08)
Complementor Valuation	0.12*	0.001
	(0.07)	(0.16)
Complementor Age	0.001	0.001
	(0.001)	(0.01)
Platform Fundraising Events	0.09***	0.17**
	(0.03)	(0.08)
Platform Age	0.02	-0.01
	(0.03)	(0.10)
Constant	0.83***	1.17*
	(0.32)	(0.61)
Platform Country FEs	Yes	Yes
Time FEs	Yes	Yes
Clustered Standard Errors	Yes	Yes
Adjusted R^2	0.08	-0.20
Number of Observations	814	814

Note: Standard errors are in parentheses. ***p < 0.01; **p < 0.05; *p < 0.1. Partnership variable is modeled in the first stage regression using the instrument variable number of SPs. The drop in one observation is due to the lagged instrument variable. We lose one observation due to the lag of the instrument variable.

Chapter 3

Platform Partnerships: How Competition Shapes Platform Resources to Complementors

Abstract: Platforms face increasingly high competition from new rival entrants. Prior literature suggests that both expanding and contracting boundaries may affect the competitive advantage of the firms. Hence, it is unclear how platforms may change their number of partnerships in response to an increase in competition. We argue that given platform partnerships may also harm the platform competitive advantage, a platform's response to the competition depends on the strength of the network effects of the platform. Specifically, a platform with stronger network effects would increase their number of partnerships. Using data on competition among the ECF platforms in Europe, as described in Chapter 2, we find that platforms, especially those with high market share and distinctiveness, increase their partnerships in response to competition. The study adds to our understanding of the decisions of different types of platforms to expand their boundaries amid a rise in competition.

Keywords: platform competition; platform installed base; platform partnerships; platform resources; rival entry; service providers

PLATFORM PARTNERSHIPS: HOW COMPETITION SHAPES PLATFORM RESOURCES TO COMPLEMENTORS

INTRODUCTION

Platforms are intermediaries that connect a large group of complementors and users (Boudreau & Hagiu, 2009). Platforms do not sell their own products but rather rely on complementors to cocreate products and satisfy the heterogeneous demands of the users (Rietveld & Eggers, 2018). This design allows platforms to maintain an "asset-light" profile (Gawer, 2021) and scale faster (Giustiziero et al., 2023) by supporting complementors in their value creation. Platforms can also engage in partnerships to provide complementors access to valuable resources and contribute to the value creation (Cutolo et al., 2022). However, such partnerships can also increase the risk of platform disintermediation, where the complementors use the partner resources to directly sell goods to the users, "bypassing" the platform itself (Gu, 2024). The tradeoff between providing resources and disintermediation risk is even higher when the platform faces high competition from rival entrants (Casner, 2024). To address this dilemma, we look at how and what type of platforms change their number of partnerships in response to competition (Eisenmann, 2008).

Platforms face increasingly high competition from new entrants (Cennamo & Santaló, 2013; Rietveld & Shilling, 2021). The platforms with superior technology (Zhu & Iansiti, 2012), higher incentives (Boudreau & Jeppesen, 2015), and open governance (Eisenmann et al., 2009) can attract complementors and users. While incumbent platforms can use their installed base of complementors and users to promote growth, leveraging network effects in the absence of

resources may also decrease platform performance (Zeng et al., 2023). We argue that, as the competition increases, platforms would provide more resources to the complementors and users, increasing their engagement in the partnerships.

Partnerships are non-equity collaborations between platforms and service providers to share mutual resources. Partnerships can help platforms maintain their "asset-light" profile and provide valuable services to complementors (e.g., Huang et al., 2013). There is an important strategic trade-off in engaging in partnerships. While partnerships may help platforms provide more heterogeneous services and reduce the complementors' dependence on the platform (Cenamor & Frishammar, 2021), platforms may lose control over the resources and governance, leading to increased multihoming, and reduced switching costs (Puranam et al., 2013). Hence, platforms with partnerships may face a heightened risk of disintermediation, where complementors may access the partner resources and "bypass" the platform for future transactions.

Platforms are heterogeneous and their incentives to intermediate and respond to competition might differ (Cennamo, 2021). We are further interested in understanding how platform network strength moderates the relationship between competition and partnerships. Specifically, we draw from the literature on network effects that argue that a platform with high market share may support stronger network effects due to the provision of higher number of choices to the complementors and users (Cennamo & Santaló, 2013; Shah & Swaminathan, 2008), and a platform with high distinctiveness may also have strong network effects due to the reduced competition and higher quality of complementors and user (Chen et al., 2017; Kapoor & Furr, 2015; Taeuscher & Rothe, 2021). Hence, we argue that a platform with high market share and high distinctiveness may use its network

We use the entrepreneurial financing industry in Europe as our data context. We collect the data on ECF platforms as described in Chapter 2. We collected additional data on platform competition from Pitchbook. Specifically, we collect data on the founding date of all the ECF platforms in Europe in each country. We measure an increase in the competition as an entry of a new platform in the headquarter of the platform.

In our analyses, we find that an increase in the number of platform competitors is associated with an increase in the number of partnerships on the platforms. However, the strength of the results depends on the platform market share and distinctiveness levels. That is, after an increase in competition, while platforms with high market share and high distinctiveness increase their number of partnerships, the platforms with low market share and low distinctiveness do not change. We argue that the results are driven by the need of the platforms to provide higher value to the complementors and the strength of their network effects that protect them from the disintermediation risk by the complementors.

We offer contributions to the literature on platform competition (Rietveld & Shilling, 2021). We show that platforms increase their number of partnerships to respond to an increase in competition. Both incumbent and rival platforms can gain from our research to increase their competitive advantage. We also contribute to the literature on platform resources (McIntyre & Srinivasan, 2017). We highlight a platform's resources shared with external service providers and show when and what types of platforms are more likely to acquire such resources. Furthermore, we offer several practical implications.

THEORY AND HYPOTHESES DEVELOPMENT

Strategic Decision of a Platform to Share Resources with Complementors

Platforms are intermediaries that connect complementors and users (Boudreau & Hagiu, 2009). Platform design is significantly different from the design of traditional firms (Kretschmer et al., 2022). The unique design allows a platform to adopt an "asset-light" profile by outsourcing the value creation to a large number of complementors (Gawer, 2021). For example, while Walmart (traditional retailer) and Amazon (platform) both have comparable revenues of about $550 billion, Walmart operates about 16 times the number of retail stores and employs about twice the number of employees of Amazon (Morgan, 2023). On the other hand, Amazon hosts about 6.30 million third-party sellers, which is significantly greater than the 0.15 million third-party sellers hosted by Walmart (Chevalier, 2024). Platform research has made significant strands in explaining platform resources, and how platforms use these resources to promote "hyperscaling" (e.g., Giustiziero et al., 2023).

Complementors are individuals or firms that use the platform technology to create products and sell to the platform users (Cenamor, 2021). Complementors may require a large number of resources to create products on platform and capture a greater value from the users (Cennamo, 2021). Hence, platforms can increase their attractiveness for complementors by providing them access to a greater number of resources. However, the literature also suggests that the provision of platform resources may discourage complementors to build their own resources (Li et al., 2023). Hence, there are tradeoffs to platform resources. Specifically, platforms may develop the resources inhouse or they may let the complementors access the resources on their own. While developing the resources internally might be cost inefficient and disincentivize complementors to create their own resources, not providing resources might reduce the attractiveness and competitive advantage of the platforms.

Platform Decision to Engage in Partnerships

Another alternative is to make partnerships with service providers to offer complementors access to the resources. Platform partnerships, defined as non-equity-based collaborations between platform owners and service providers, can not only enhance the value of the platform (Li et al., 2023) but also satisfy the heterogeneous needs of the complementors and users (Rietveld & Eggers, 2018). Figure 1 presents a flow chart of the resource needs of the complementors and the decisions available to platforms and complementors.

----------INSERT FIGURE 1 ABOUT HERE----------

An independent community of service providers emerges around platform ecosystem to fill the resource gap between the complementor needs and platform offerings (Cutolo et al., 2022). We argue that platforms can engage in partnerships with these service providers to make the resources available for the platform complementors. The more integrated services developed through the partnerships might make the resources of service providers more attractive. The literature on platform ecosystems suggests that acquiring external resources and expanding platform boundaries, such as through platform envelopment (Eisenmann et al., 2011) and vertical integration (Zhu & Liu, 2018), can promote platform growth and competitive advantage (Ghazawneh & Henfridsson, 2013; Karhu et al., 2018).

Platform Competition, Resources, and Partnerships

Once perceived as a winner-takes-all market, platform scholars have shown that there are strategic tradeoffs in platform growth (e.g., Cennamo & Santaló, 2013; Karhu et al., 2024). Indeed, new entrant platforms are increasingly challenging the position of the leader platforms. For example, new entrant platforms can use superior technology (Zhu & Iansiti, 2012), higher

incentives (Boudreau & Jeppesen, 2015), and open governance (Eisenmann et al., 2009) to gain a competitive advantage and attract complementors and users.

As the competition rises, platforms may want to "lock in" complementors (Giovannetti & Siciliani, 2023). Complementor base can not only help the platform attract a greater number of complementors and users but also restrict the competitor platforms to gaining an initial installed base of complementors and users, thus creating entry barriers (McIntyre et al., 2021). Since platforms can lock-in complementors by providing them with a greater number of resources (Saadatmand et al., 2019), we hypothesize that platforms will increase their number of partnerships when the number of competitors increases.

Hypothesis 1. *The greater the number of competitors, the greater the number of platform partnerships.*

Platform Partnerships and Disintermediation Risk

The external resources through partnerships can also have a negative effect on the platform, as it may lose some control over the resources. For example, external resources may increase the risk of platform "disintermediation," whereby complementors exit from the platform and deal with the service providers and users directly (Gu, 2024). Such tradeoffs are especially important when firms face high competition (Andrevski & Ferrier, 2019). On the one hand, platforms may want to increase their value proposition to the complementors and users to strengthen their position. On the other hand, they may want to protect their installed base from the threat of the new entrants. Hence, we argue that only platforms that can protect themselves from the disintermediation risk will engage in partnerships to provide a higher value to the complementors.

One of the most valuable resources of a platform is its installed base of complementors and user – i.e., the pool of complementors and users hosted by the platform. An installed base can, for instance, help a platform provide higher value, gain legitimacy, and manage bargaining power in the ecosystem. We are particularly interested in looking at the installed base from the perspective of market share and distinctiveness in affecting a platform's response to competition through partnerships.

Platform Market Share

Platform market share is a metric of the installed base that captures the number of complementors hosted by a platform with respect to the market (Cennamo & Santaló, 2013). A high market share is a significant resource for a platform, helping it to promote a dominant design (Dubé et al., 2010), charge high rents (Gallaugher & Wang, 2002), and reduce the negative effects of multihoming complementors (Landsman & Stremersch, 2011). Platform market share can also deter further competition (Akerlof et al., 2024). Hence, the strategies of a platform with a high market share differ substantially from the strategies of a platform with a low market share.

We argue that, when competition arises from rival entrants, a platform with a high market share can experience a "lock-in" effect, whereby the complementors and users still find it highly valuable to join and create value on the platform. Furthermore, platforms can also leverage market share to increase their bargaining power vis-à-vis the other market actors, leading to higher-value partnerships (Shah & Swaminathan, 2008). Hence, a platform market share can reduce the risk of disintermediation by the complementors and service providers, making partnerships an attractive strategy in response to increasing competition.

Hypothesis 2. *Platform market share positively moderates the relationship between competition and partnerships such that, as a platform's market share increases, it engages in a greater number of partnerships in response to an increase in competition.*

Platform Distinctiveness

Platform distinctiveness represents the degree to which the complementors hosted by a platform differ compared to the complementors hosted by the competitors (Haans, 2019). Platform distinctiveness can be an important source of competitive advantage even in the presence of network effects (Farronato et al., 2024). The distinctive platforms may host a niche of complementors, who may attract users and complementors that value the expertise and "community" of other market actors in that area. The scholars in strategy and management have highlighted that indeed distinctiveness can create strong network effects within that community (Colladon, & Naldi, 2020; Taeuscher & Rothe, 2021).

Furthermore, the distinctive platforms due to their unique position as compared to the competitors might attract better resources from the service providers. Hence, we argue that, as the number of competitors increases, the distinctive platforms would like to provide more resources to the complementors to create the "lock in" effect and the risk of the disintermediation by the complementors and service providers would be low due to the unique strength of the niche "community" (Arora & Fosfuri, 2003). Figure 1 shows our hypotheses model. Thus, we hypothesize:

Hypothesis 3. *Platform distinctiveness positively moderates the relationship between competition and partnerships such that, as a platform's distinctiveness increases, it engages in a greater number of partnerships in response to an increase in competition.*

RESEARCH METHODOLOGY

We have described our data context and data collection strategy in Chapter 2. In addition to the data collected in Chapter 2, we collect further data on platform competition using Pitchbook. For all the 12 countries in our sample, we recapture the number of platforms operating in that country. We describe our main variables below.

Variables

Independent variable

Platform Competition. We measure platform competition as the total number of platforms operating in a country in a quarter (Eisenmann, 2008). If a new platform enters the market, it will increase the platform competition. Similarly, if an existing platform leaves the market, it will decrease platform competition. Hence, the number of platforms allows us to capture the competition faced by a platform in a quarter.

Dependent variable

Partnerships. For consistency, we use the same measure as described in Chapter 2. We define a partnership as a non-equity collaboration between a platform and a third-party actor to share resources for mutual benefits (Reuer & Devarakonda, 2016). We create our platform partnership variable from the blog posts published by all the platforms on their website.[17] We employ the top2vec model in Python to analyze the text of the blog posts and identify and cluster the blog posts based on the different topics in the data (e.g., Fedorova & Stepanov, 2023).[18] Recent works have used topic modeling to analyze the narratives of textual data in management research (e.g., Haans, 2019; Kaplan & Vakili, 2015) including articles on platform ecosystems

[17] A corporate blog is a website frequently updated by a firm representative to share information with the platform's stakeholders (Seltzer & Mitrook, 2007).
[18] We use Google Translate to translate all the blog posts into English before performing top2vec modelling.

(e.g., Cutolo & Ferriani, 2023; Taeuscher et al., 2022; Van Angeren et al., 2022). In our case, top2vec models have significant advantages over keyword analysis (a method used traditionally in the partnership literature, e.g., Schilling, 2009). Specifically, in our analysis, we could differentiate not only between the partnership posts and non-partnership posts but also between the different types of platform partnerships, i.e., with service providers and complementors (which is outside the scope of our study).

Our topic model identifies 103 topics among all the blog posts in our sample. Appendix Table A2 shows the keywords in the top 15 topics and our interpretation of the topics. The word-embedded topic modeling approach as opposed to keyword analysis allows us to account for the different meanings of the partnerships in our text data. The word 'partnership' appears in multiple unrelated topics in our analyses, confirming the need to conduct an advanced topic analysis and group the posts based on their similarity (see Appendix Table A3). We select all the topic containing words "partnership," "alliance," "agreement," and "collaboration." Then we go through all the documents in each of the topics to select the documents that talk about a platform's partnership with the service provider. The ECF platforms in our sample engaged in partnerships with market actors, such as accelerators, campuses, and corporates. All of the posts selected in this step are from a single topic as identified in the topic modelling. We record 68 partnerships between platforms and service providers in our data period. We measure the number of partnerships as the log of sum of partnerships made by a platform in a quarter (e.g., Huang et al., 2013).

Moderating Variables

Platform Market Share. ECF platforms generate revenue by charging the startups a fixed percentage of the funds raised. Hence, the sum of all the funds raised on a platform by all the complementors in a quarter is directly proportional to the platform revenue. Thus, we measure platform market share as a ratio of the sum of funds raised/invested on a platform and the total funds raised/invested on all the platforms in a quarter (Cennamo & Santaló, 2013).

Platform Distinctiveness. We measure platform distinctiveness as the Euclidean distance of a platform in a quarter from the other platforms in the country of the platform (Taeuscher & Rothe, 2021). We use the fund raised, sector, and headquarters country of the startups hosted by the platforms to compute the distance. Table 1 presents the descriptions of the main variables in our study.

----------INSERT TABLE 1 ABOUT HERE----------

RESULTS

Descriptive Statistics

Table 2 provides summary statistics and correlations for the variables used in the analyses. From these correlations, we note the *partnership* has a positive and significant correlation with the *valuation* and *raised* variable. It indicates that platforms that attract complementors with a higher valuation and that help startups raise a greater sum of funds engage in a greater number of partnerships. We note a positive correlation between *partnership* and *platform market share* and *distinctiveness*. Platforms that are dominant and platforms that are distinct both engage in a greater number of partnerships. Finally, *partnership* is also positively correlated with *competition*, suggesting that, when platforms are more likely to engage in *partnerships* when they face high levels of competition. We acknowledge that these are

correlations and should be interpreted with caution. In the following analyses, we account for the confounding effects and disentangle the relationships using multivariate regression analyses.

----------INSERT TABLE 2 ABOUT HERE----------

Regression Analyses

In Table 3, we report the OLS regression results of the effect of *competition* on *the number of partnerships.* Models (1) and (2) only include the control variables without and with fixed effects, respectively. From model (2), we note that valuation ($\beta = 0.08$, $p = 0.06$) has a positive effect and complementor age ($\beta = -0.002$, $p = 0.09$) has a negative effect on the number of platform *partnerships*. Our interpretation is that platforms face a tradeoff in engaging in partnerships. On the one side, a higher quality installed base allows platforms to engage in more favorable partnerships and, on the other side, higher quality complementors are likely to be able to use the platform partners to disintermediate. Furthermore, we find that *platform fundraising events* positively affect the platform *partnership.* This might be driven by the positive effects of fundraising events on the attractiveness of the platform as a partner for the service providers.

----------INSERT TABLE 3 ABOUT HERE----------

Model (3) includes the explanatory variables for the hypothesis H1. We find strong support for our hypotheses indicating that platforms increase their number of *partnerships* in response to an increase in *competition* ($\beta = 0.06$, $p = 0.006$). We argue that the increase in the number of partnerships is due to the greater need to provide resources to the complementors to gain a competitive advantage. In order to find further support for our argument, we predict and test when these effects are stronger or weaker.

----------INSERT FIGURE 1 ABOUT HERE----------

In model 4, we test how the *market share* of a platform affects its likelihood of engaging in *partnerships* as the *competition* increases. We find support for our argument that platforms that can make better partnerships and with fewer consequences – i.e., platforms with high market share – are more likely to increase their number of partnerships after competition increases ($\beta = 0.27$, $p = 0.003$). Furthermore, in Figure 1, we note that, in response to an increase in competition while platforms with high market share increase their number of partnerships, platforms with low market share do not engage in a greater number of partnerships.

----------INSERT FIGURE 2 ABOUT HERE----------

Finally, in model 5, we test how the distinctiveness of the platform from the other platforms affects its likelihood of engaging in *partnerships* as the *competition* increases. As hypothesized, the results suggest that as the competition increases platforms with a high level of distinctiveness are more likely to increase their number of partnerships as compared to platforms with a low level of distinctiveness ($\beta = 0.03$, $p = 0.01$). We argue that the platforms with a high level of distinctiveness are under greater threat from the entry of new rivals and, to provide support to the complementors and gain competitive advantage, they are likely to acquire partner resources. In Figure 2, we observe that following competition while platforms with high distinctiveness increase their number of partnerships, platforms with low distinctiveness do not engage in a greater number of partnerships.

We are running a battery of robustness checks to substantiate the results. First, in our analyses, we only model the increase in competition from other ECF platforms. However, platforms may also face competition from traditional firms such as the number of venture capitalists (VCs). We are running a test to understand the response of a platform to an increase in competition from such market actors.

DISCUSSION

In this chapter, we explore how and what type of platforms change their number of partnerships in response to competition. Platforms are increasingly facing threats from new rivals. Given that platforms maintain an "asset-light" profile (Gawer, 2021) and resources are fundamental to gaining competitive advantage (Barney, 1991), it is especially important to understand how platforms respond to increasing competition. We argue that following competition platforms can engage in partnerships to acquire resources and provide support to the complementors.

Platforms also face a threat while engaging in partnerships. Complementors and partners can use the platform to gain access to the other side and "disintermediate" platforms for future transactions (Gu, 2024). Hence, following competition, platforms need to gain enough value from the partnerships that outweigh their costs. We show that platforms with high market share and high distinctiveness are more likely to engage in partnerships following an increase in competition.

We collected data on competition faced by the equity-crowdfunding platforms in Europe and their strategic partnerships between 2012 and 2022. We used Pitchbook to collect data on platform competition and corporate blogs to capture the strategic partnership variable. We used the platform website to collect data on the campaigns held by the platform to measure our platform market share and distinctiveness variables. The regression analyses provide support for our arguments.

Contributions to Conversations on Platform Competition

We offer important contributions to the literature on platform competition. First, the extant literature on platform competition (for a review, see Rietveld & Shilling, 2021) has focused on how platforms use various incentives and control mechanisms to gain competitive advantage (Chen et al., 2022; Kyprianou, 2018). In complementary to this research, we shown when platforms acquire external resources – i.e. when they engage in partnerships.

Further literature can develop on our findings about the platform competition and partnerships and contribute on two fronts. First, they can focus on the performance effect of partnerships in response to the increase in competition. We would benefit from more understanding of when platforms that engage in partnerships can gain competitive advantage and create "lock-in" effects and when they face the risk of disintermediation. Second, future research could expand on the behavior of complementors based on the information that some platforms engaged in partnerships, and some did not after an increase in platform competition. We would also benefit from our understanding of how platform competition and partnerships affected complementor multihoming.

Contributions to Conversations on Platform Resources

We also contribute the literature on platform resources (McIntyre & Srinivasan, 2017). The literature has shown platform boundary decisions such as envelopment (Eisenmann et al., 2011) and vertical integration (Zhu & Liu, 2018) are important to respond to competition. We add to this literature by showing that platforms also expand their boundaries through partnerships with the service providers. We also highlight how and what types of platforms alter their number of partnerships in response to an increase in competition. The literature can benefit from a deeper understanding of how platforms balance the development of resources through internal arrangements and partnerships to respond to an increase in competition.

Practical Implications

We also offer several practical implications. For platform owners, our research suggests that, as the competition increases, platforms engage in a greater number of partnerships to provide value to the complementors. Furthermore, the increase in the number of partnerships in response to competition is greater for dominant and distinct platforms. These findings are especially important for the managers of new platforms who might be interested in understanding how incumbent platforms might react to their entry.

Our research also guides public policy by shedding light on the consequences of competition among platforms. Specifically, we show how different platforms may react to an increase in competition. Government institutions can use these findings to regulate competition among platforms and to engage in partnerships with the platforms.

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TABLES AND FIGURES

Figure 1. Resources from platform, service providers, and complementors

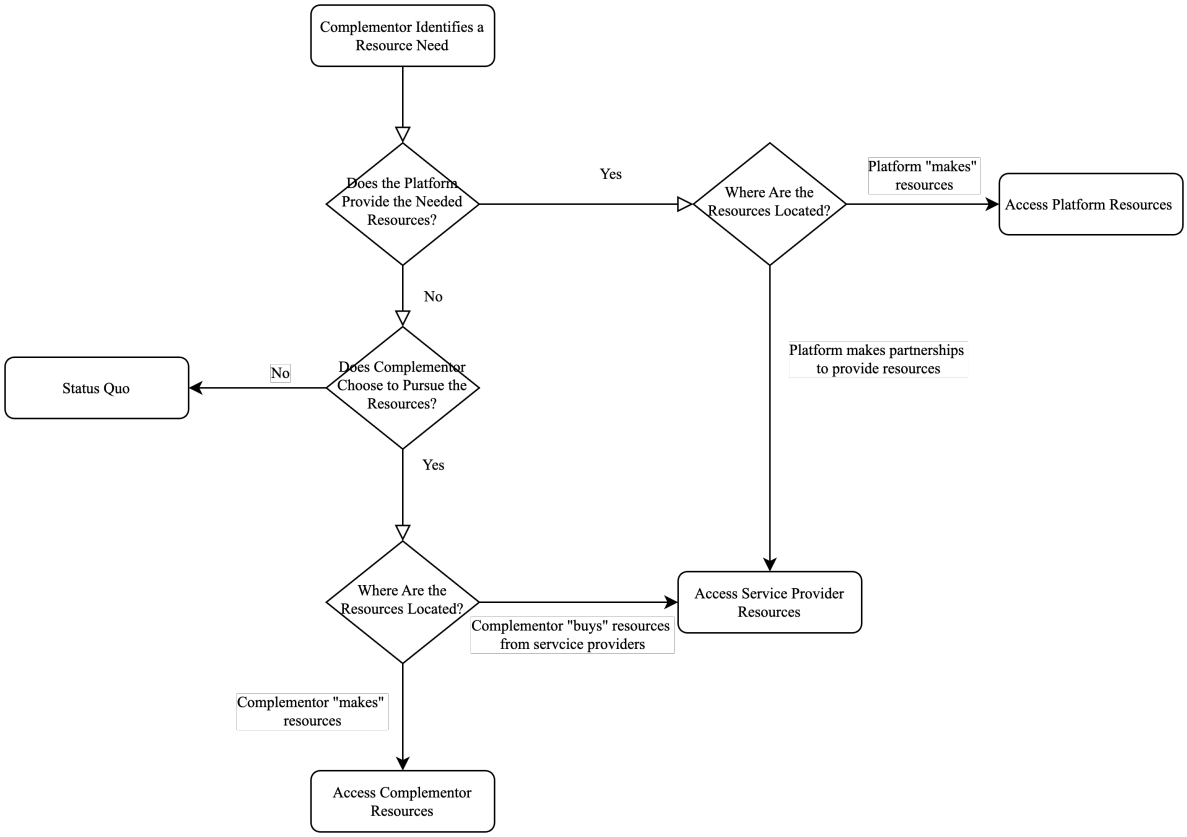


Table 1. Description of the Main Variables

Variable	Definition	Primary Data Source(s)
Platform Competition	The number of platforms operating in a country in a quarter.	Pitchbook
Platform Market Share	The ratio of funds raised on a platform in a quarter and the sum of funds raised on all the platforms in that country in that quarter.	Pitchbook
Platform Distinctiveness	Euclidean distance of a platform from the other platforms operating in a country in a quarter calculated based on the complementor size, sector and country.	Pitchbook
Partnership	The number of partnerships of a platform in a quarter (lead by 1).	Platform Website

Table 2. Descriptive Statistics and Correlation

Variable	Mean	SD	Min	Max	1	2	3	4	5	6	7	8
1. Partnerships	4.11	8.43	0	75								
2. Competition	0.03	0.16	0	1	0.36*							
3. Market Share	0.02	0.13	0	1	0.29*	0.25*						
4. Distinctiveness	0.37	0.48	0	1	0.20*	0.17*	0.10*					
5. Equity	0.2	0.4	0	1	-0.15*	-0.03	-0.04	0.29*				
6. Valuation	3.88	2.81	0	8.94	0.32*	0.10*	0.10*	-0.07*	-0.09*			
7. Raised	0.81	1.21	0	4.61	0.28*	0.15*	0.13*	0.04	-0.06*	0.33*		
8. Complementor Age	0.62	0.91	0	7.17	0.45*	0.17*	0.13*	0.26*	-0.05	0.34*	0.44*	
9. Platform Fundraising Events	1.56	2.07	0	9	0.33*	0.14*	0.08*	0.12*	-0.04	0.24*	-0.00	0.26*

Note. N = 825. Raised and *Target* are in the thousands, *Equity* is in percentage, and *Valuation* is in Millions. *Campaigns* lead by one quarter. Average Raised, Average Equity, Average Valuation, and Total Posts are in log.
*Significant at less than 10% level.

Table 3. The effect of Partnership and its types on the Number of Campaigns on a platform.

	Dependent Variable = Partnership				
	(1)	***(2)***	***(3)***	***(4)***	***(5)***
Platform Competition (H1)			0.06***	0.01	-0.02
			(0.02)	(0.02)	(0.02)
Platform Competition × Platform Market Share (H2)				0.27***	
				(0.09)	
Platform Competition × Platform Distinctiveness (H3)					0.03**
					(0.01)
Platform Market Share				-0.12*	
				(0.07)	
Platform Distinctiveness					0.03
					(0.03)
Equity	0.02*	0.01	0.01	-0.01	0.011
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Valuation	0.07**	0.08*	0.08**	0.03	0.04
	(0.04)	(0.04)	(0.04)	(0.03)	(0.04)
Raised	-0.01*	0.001	0.01	-0.01	-0.03***
	(0.001)	(0.001)	(0.01)	(0.01)	(0.01)
Complementor Age	0.001*	-0.001*	0.001*	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Platform Fundraising Events	0.03***	0.02*	0.02	0.001	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Constant	-0.02	-0.01	-0.01	-0.05	0.17
	(0.02)	(0.09)	(0.09)	(0.10)	(0.11)
Platform Country FEs	No	Yes	Yes	Yes	Yes
Time FEs	No	Yes	Yes	Yes	Yes
Clustered Standard Errors	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.02	0.04	0.04	0.10	0.07
Number of Observations	815	815	815	815	815

Note. The dependent variable Partnerships (lead by a quarter). Clustered standard errors at the platform level are in the parentheses. *$p < .10$; **$p < .05$; ***$p < .01$.

Figure 1. Moderation Effect of Platform Market Share on the Relationship Between Competition and Partnerships.

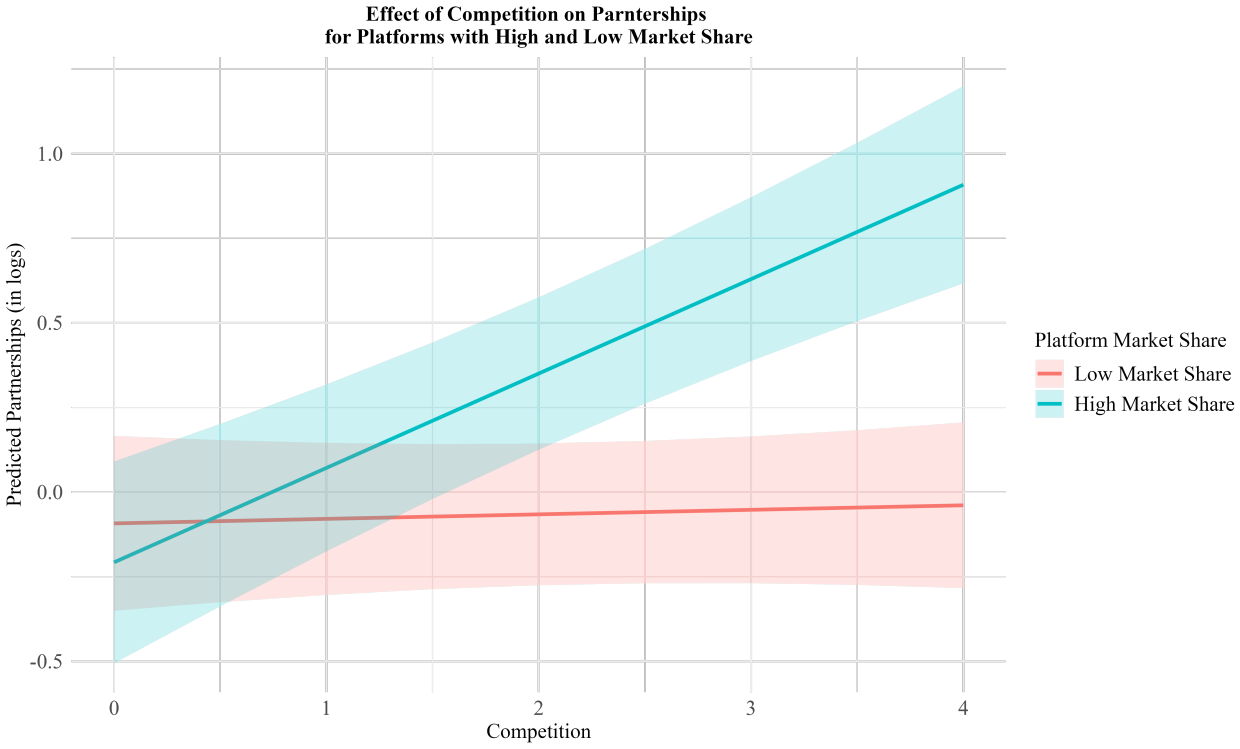
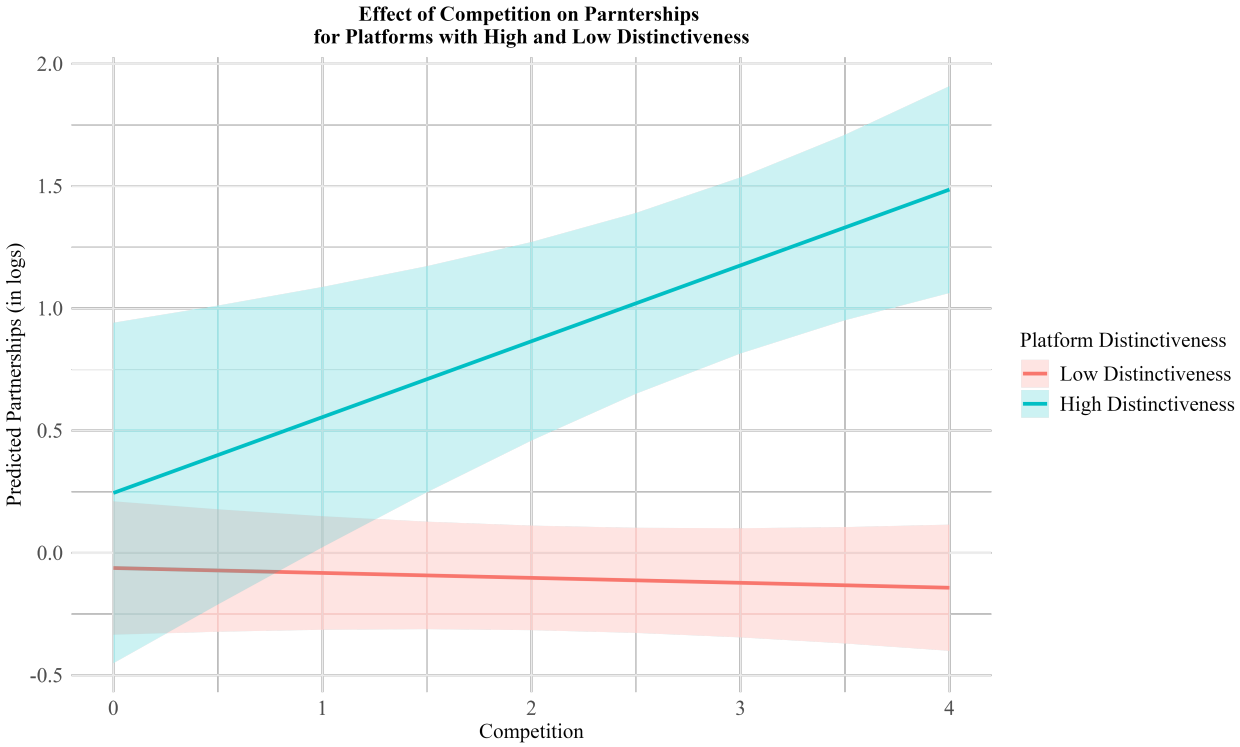


Figure 2. Moderation Effect of Platform Distinctiveness on the Relationship Between Competition and Partnerships.



CONCLUSION

Platform business model is increasingly become the dominant design in most of the industries. Platform design allows it to outsource the value creation to the complementors and focus on building the core technology and governing the transactions between the complementors and users. Hence, platforms build a unique set of resources that allow them to hyperspecialize and hyperscale. However, once seen as a winner-takes-all design, platform scholars have highlighted the strategic tradeoffs related to platform growth.

This thesis focuses on highlighting these strategic tradeoffs to platform growth, particularly related to platform strategy to engage in partnerships. Chapter 1 provides an integrative review of the literature on platform strategy in IS, management, and marketing. We analyze 212 articles published in the FT50 journals on platform strategy and identify various strategies to create and capture value and promote scope of the platform. Furthermore, we integrate the literature on platform strategy to contribute to value creation through technology, intermediation, resources and services, and engagement and underscore antecedents and consequences of such decisions. we also offer insights on the tradeoffs inherent in these platform strategies.

In chapter 2, we focus on platform strategy to make partnerships with service providers. we argue that platforms can engage in partnerships to provide higher value to the complementors and gain a competitive advantage. However, the resources provided by the platform partners would be more attractive to the smaller complementors who might not have the means to gain access to such services otherwise. Hence, the partnerships may decrease the overall size of the complementors entering the platform, limiting platform growth.

In chapter 3, we study platform response to competition through partnerships. While the installed base of the incumbent platforms can build entry barriers to the industry, the

strategic tradeoffs in platform growth makes it vulnerable to high competition. Hence, as the competition increases platforms may increase the value provided to the complementors to maintain a competitive edge. However, providing value to complementors through external partnerships may also increase the risk of platform disintermediation, where the complementors may use the partner services to serve the users directly. Hence, we build a study to show that, after an increase in competition, only platforms with high market share and high levels of distinctiveness would engage in partnerships.

Together, these studies provide valuable insights on platform growth. They offer several significant implications to research scholars, platform managers, and regulators. Specifically, this thesis contributes to the literature on platform competition and platform resources and highlights the importance of platform partnerships to promote growth. Finally, platform managers may use the findings to make appropriate decisions on when and how to engage in partnerships with service provider. Government regulators may take insights on the complex interactions among the multiple sides of a platform and how to regulate these interactions.

CONCLUSIÓN

El modelo de negocio basado en plataformas se está convirtiendo cada vez más en el diseño dominante en la mayoría de las industrias. El diseño de plataformas permite externalizar la creación de valor hacia los complementadores y centrarse en desarrollar la tecnología central y gobernar las transacciones entre complementadores y usuarios. Así, las plataformas construyen un conjunto único de recursos que les permite hiper-especializarse y escalar a gran velocidad. Sin embargo, aunque antes se consideraba un diseño de "el ganador se lo lleva todo", los académicos en plataformas han destacado los compromisos estratégicos relacionados con el crecimiento de las plataformas.

Enfocamos nuestra tesis en resaltar estos compromisos estratégicos hacia el crecimiento de las plataformas, particularmente relacionados con la estrategia de las plataformas para establecer asociaciones. El Capítulo 1 presenta una revisión integradora de la literatura sobre estrategias de plataformas en las áreas de sistemas de información, gestión y mercadotecnia. Analizamos 212 artículos publicados en revistas del FT50 sobre estrategia de plataformas e identificamos diversas estrategias para crear y capturar valor, además de promover el alcance de las plataformas. Asimismo, integramos la literatura sobre estrategias de plataformas para contribuir a la creación de valor a través de la tecnología, intermediación, recursos y servicios, y el compromiso, subrayando los antecedentes y consecuencias de dichas decisiones. También ofrecemos ideas sobre los compromisos inherentes a estas estrategias de plataformas.

En el Capítulo 2, nos centramos en la estrategia de las plataformas para establecer asociaciones con proveedores de servicios. Argumentamos que las plataformas pueden formar asociaciones para ofrecer mayor valor a los complementadores y obtener una ventaja competitiva. Sin embargo, los recursos proporcionados por los socios de la plataforma serían

más atractivos para los complementadores más pequeños que no tienen los medios para acceder a dichos servicios de otra manera. Por lo tanto, estas asociaciones pueden reducir el tamaño general de los complementadores que ingresan a la plataforma, limitando el crecimiento de la plataforma.

En el Capítulo 3, estudiamos la respuesta de las plataformas a la competencia a través de asociaciones. Aunque la base instalada de las plataformas incumbentes puede construir barreras de entrada a la industria, los compromisos estratégicos en el crecimiento de las plataformas las hacen vulnerables a una alta competencia. Por lo tanto, a medida que aumenta la competencia, las plataformas pueden incrementar el valor ofrecido a los complementadores para mantener una ventaja competitiva. Sin embargo, proporcionar valor a los complementadores mediante asociaciones externas también puede aumentar el riesgo de desintermediación, donde los complementadores pueden usar los servicios de los socios para atender directamente a los usuarios. Así, realizamos un estudio para demostrar que, tras un aumento en la competencia, solo las plataformas con una alta cuota de mercado y altos niveles de distintividad se comprometerán en asociaciones.

En conjunto, estos estudios proporcionan ideas valiosas sobre el crecimiento de las plataformas. Ofrecen varias implicaciones significativas para los académicos, gestores de plataformas y reguladores. Específicamente, nuestra tesis contribuye a la literatura sobre competencia entre plataformas y recursos de plataformas, y destaca la importancia de las asociaciones de plataformas para promover el crecimiento. Finalmente, los gestores de plataformas pueden usar nuestros hallazgos para tomar decisiones apropiadas sobre cuándo y cómo establecer asociaciones con proveedores de servicios. Los reguladores gubernamentales pueden obtener ideas sobre las complejas interacciones entre los múltiples lados de una plataforma y cómo regular estas interacciones.