Lisbon School of Economics & Management
Universidade de Lisboa

MASTER

ECONOMICS AND MANAGEMENT OF SCIENCE, TECHNOLOGY, AND INNOVATION

MASTERS FINAL WORK

DISSERTATION

DIGITAL PLATFORMS: THE ROLE OF COMPLEMENTORS IN THEIR INTERNATIONALIZATION AND PERFORMANCE

JOSÉ JOÃO MONTEIRO VIEIRA

OCTOBER - 2022

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SUPERVISION:

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Abstract

Digital platforms are becoming increasingly important in today's society and economy. The progress in technology and the always-growing number of internet users has given power to platforms, not only creating new industries but also disruptively changing the ones that already existed. This is a widely studied topic which, in turn, gives plenty of opportunities to advance the study of this phenomenon. Based on a literature review on platforms, ecosystems, and internationalization, this dissertation intends to participate in this effort by exploring the effects that new complementors in new local ecosystems have on platforms' internationalization and its Ecosystem-Specific Advantages both locally and internationally. To answer these questions, an explanatory case study is developed. It is based on two contrasting cases, Aptoide and Zomato Portugal.

This work concluded that complementors are vital for the platform's value creation and differentiation over its rivals. For platforms that cannot transfer their complementors from one ecosystem to the other, including local complementors in their new ecosystem is crucial for the successful operation in the new country or region. Finally, complementors help the platform adjust to the cultural preferences of the users, which augments the value that new users perceive from it, helping it to establish itself.

Keywords: Digital platforms; Digital platforms internationalization; Ecosystems; Complementors; Ecosystem-Specific Advantages;

Resumo

As plataformas digitais estão a tornar-se cada vez mais importantes na sociedade e economia contemporâneas. Os progressos realizados na tecnologia, tal como o sempre crescente número de utilizadores da internet, deram poder às plataformas, não só criando múltiplas novas indústrias, mas também mudando de forma disruptiva algumas já existentes. Este é um tópico amplamente estudado o que, por sua vez, cria diversas oportunidades de avançar com o estudo deste fenómeno. Baseada numa revisão de literatura sobre plataformas, os seus ecossistemas e a sua internacionalização, esta dissertação pretende participar neste esforço ao explorar os efeitos que os novos complementadores em novos ecossistemas locais têm tanto na internacionalização das plataformas, como nas suas *Ecosystem-Specific Advantages*, local e internacionalmente. De forma a responder a esta questão, é desenvolvido um estudo de caso explanatório. Ele baseia-se em dois casos contrastantes, a Aptoide e a Zomato Portugal.

Com este trabalho concluiu-se que os complementadores são vitais para a criação de valor e diferenciação da plataforma em relação às suas rivais. Para plataformas que não conseguem transferir os seus complementadores de um ecossistema para outro, incluir complementadores no novo ecossistema é crucial para a plataforma operar de forma bem sucedida no novo país ou região. Finalmente, os complementadores ajudam a plataforma a ajustar-se às preferências culturais dos utilizadores, o que aumenta a perceção de valor destes, ajudando a plataforma a estabelecer-se.

Palavras-chave: Platformas digitais; Internacionalização de plataformas digitais; Ecossistemas; Complementadores; Vantagens específicas de ecossistemas

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List of Abbreviations

API – Application Programming Interfaces

App – Application

B2B – Business to Business

B2C – Business to Consumer

CAGE – Cultural, Administrative, Geographic, and Economic

CEO – Chief Executive Officer

ESA – Ecosystem Specific Advantages

FSA – Firm Specific Advantages

GAFA – Google, Amazon, Facebook, and Apple

IB – International Business

IIT – Indian Institute of Technology

LB FSA – Location Bound Firm Specific Advantages

LoF – Liability of Foreignness

LoO – Liability of Outsidership

MNE – Multinational Enterprise

NLB FSA – Non-Location Bound Firm Specific Advantages

OEM – Original Equipment Manufacturers

SDK – Software Development Kits

TV – Television

USA – United States of America

1 Introduction

It's already hard to remember how human beings used to live without digital platforms. They provide us with a way of satisfying our most immediate needs, whether it is social interaction, restaurant meals, or simply listening to music at the distance of a fingertip. The democratization of the Internet has been a massive driver for the digital platforms' success. Its number of users increased over the past 15 years, being today around 63% of the world's population (ITU, 2021). The Covid-19 pandemic has increased the number of people using the Internet and relying solely on digital platforms to work.

This overwhelming number of active digital platforms' users and the value we give to tech companies nowadays also have financial repercussions. When we analyse the companies that are now at the top of the market capitalization rankings, we can easily find that digital platforms have conquered the top spots. PWC (2020) ranks four digital platforms in the top 5 companies with the highest market cap. In terms of brand reputation, we can also see a change in the scenario. Analysing the S&P 500 ranking between 1975 and 2018, it is easy to understand that brands like General Electric, Coca-Cola, or Procter & Gamble have lost the highest ranks of the table to digital platforms like Microsoft, Amazon, or Facebook. The increase in value and brand reputation that these companies experience regularly is driven by the always-increasing number of active users that themselves and the Internet have.

The internationalization of companies is a widely studied subject that motivated the emergence of theories and models that seek to explain it. There has been a debate in academia on whether the classic internationalization theories are suitable for digital platforms. Monaghan et al. (2020) take a stand on this debate by writing that "we do not take the position that Johanson and Vahlne's arguments are inconsistent with born-digital firms because we believe that the nature of internationalization is that no one theory or set of arguments is fully explanatory" (p. 20). This dissertation will follow that line of thought, using Johanson and Vahlne's model (1977; 2009) and the internalization theory (Buckley & Casson, 1976; 2009; Rugman, 1981; Hennart, 1982) as relevant starting points to understand the digital platforms' internationalization.

This dissertation aims to contribute to platform studies by relating their internationalization with their Ecosystem-Specific Advantages (ESA). This choice of theme was influenced by the courses taught during the master, as well as by possible future job opportunities. The research relating the ESA concept with internationalization will help managers improve their decision-making regarding the selection of the countries where they should expand their operations and the local ecosystems developed overseas.

This dissertation is divided into eight chapters. The first one is an introduction to the subject that will be studied and how the research will be done. The second provides a literature review of digital platforms, their ecosystems, and how they internationalize. The research questions are formulated in the third chapter, followed by a presentation of the methodology used. The fifth and sixth chapters present each case studied, as well as their empirical results. The seventh chapter combines the knowledge that was previously gathered to discuss the findings. Finally, the last chapter provides the conclusion to the study.

2 Literature Review

This chapter presents a literature review on digital platforms and their internationalization process. It is structured as follows: (i) definition and characterization of digital platforms, by defining them as markets and looking at their architecture and pricing strategies; (ii) the importance of ecosystems to the platforms, by exploring their governance and value creation characteristics; and (iii) the internationalization process of platforms and the ESA.

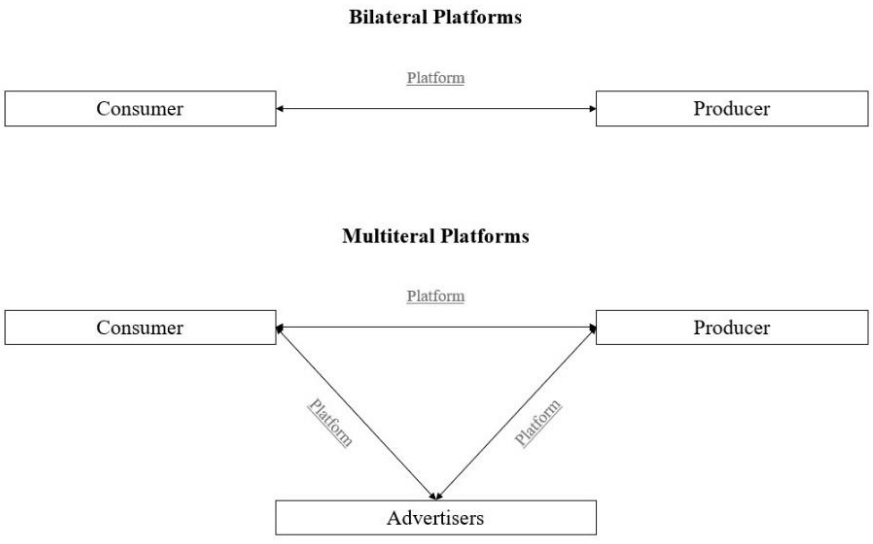
2.1 Platforms

The fact that we are today more dependent than ever on the Internet and all its resources is fertile ground for what Helmond (2015) refers to as “platformization”, i.e., “the rise of the platform as the dominant infrastructural and economic model of the social web” (p. 5). This platformization allows companies to be independent of their geographic localization, allowing their potential markets to expand (Constantinides et al., 2018). However, what exactly is a digital platform? Constantinides et al. (2018) describe them as being “a set of digital resources - including services and content - that enable value-creating interactions between external producers and consumers” (p. 381). Social

networks, such as Facebook and Twitter, food delivery companies, like Uber Eats and Glovo, and streaming platforms, like Spotify and Netflix, are examples of digital platforms.

Platforms were first seen as bilateral markets, the consumer-producer dyad (Stallkamp & Schotter, 2018). The most recent research, however (Evans & Schmalensee, 2014; Hagiu & Wright, 2015; Stallkamp & Schotter, 2018), sees them as multilateral markets, i.e., that more than two different groups of actors are involved in the platform. For example, on most platforms we use nowadays, like YouTube, there is an interaction between consumers, producers, and advertisers. Platforms work as the conducting wire between the different actors involved (Gawer, 2014), making their interactions easier (Evans & Schmalensee, 2014), as visible in Figure 1. The value extracted from the platform depends solely on the interaction between its different users (Rochet & Tirole, 2003). From this interaction between the actors, two different types of externalities arise: Katz and Shapiro (1985) refer to them as direct network effects and indirect network effects. The direct network effects result from the value users give to interacting with the other platform users (Cennamo & Santalo, 2013). The job platforms, like LinkedIn or JobTeaser, are examples of these effects, given that the users obtain more value using these platforms if there is a considerable number of participants. In turn, the indirect network effects are described by Cennamo & Santalo (2013) as the anticipation by the platform users that "platforms with more users (…) will also offer a wider number and variety of complementary products and services" (p. 1331).

Figure 1: Bilateral and multilateral platforms



Source: developed by the author

For example, in gaming platforms, users expect that the platforms with the highest number of users are also the ones with the wider variety of available games. These indirect network effects originate the *chicken-and-egg* problem, described by Caillaud and Julien (2003, p. 310) like this: "to attract buyers, an intermediary should have a large base of registered sellers, but these will be willing to register only if they expect many buyers to show up". These network effects make the users a critical resource for this type of market, unlike what happens in other markets (Sun & Tse, 2009).

When platforms want to bring multiple sides on board, pricing strategies are a way of helping them overcome the chicken-and-egg problem (Springer & Petrik, 2021). Sammut-Bonnici and Channon (2015) define pricing strategies as the "policy a firm adopts to determine what it will charge for its products and services" (p. 1). The rationale behind this policy should be that the costs of operation are fully covered by the product or service's price, as well as ensuring an acceptable profit margin, so the investment has a return (Sammut-Bonnici & Channon, 2015).

Platform pricing strategies are usually more complex to implement than in traditional business models (Evans & Schmalensee, 2014). As explained by McIntyre et al. (2021), "an important part of generating revenues from the benefits that users perceive in a multisided platform is deciding which side to charge and which one to subsidize and when" (p. 9). This leads to platforms charging the actors what Springer and Petrik (2021) call "platform-ecosystem participation fees" (p. 116), which will be different according to each platform's pricing strategy. Subsidizing a group of users in the platform usually means that a group of actors will pay more than the marginal costs, and another will pay less. (Gawer, 2021). For example, if a bilateral platform decides to attract buyers, that measure will make the platform attractive to sellers, meaning buyers are subsidized (Armstrong & Wright , 2007). The price, however, must be carefully picked: if it is too low, it will penalize the platform; if it's too high, users will not be attracted to join it (McIntyre et al., 2021).

Some platforms adapt their pricing strategies to the demand oscillations their product or service has during the day. The dynamic pricing concept has been recently brought by mobility platform firms, such as Uber or Bolt (McIntyre et al., 2021). The rationale behind this pricing strategy is that users must pay a higher fare when the app registers a higher demand in a particular area. This way, drivers will be more incentivized to be on the road

during rush hours, a period when passengers will also be more willing to pay a higher price (McIntyre et al., 2021).

Pricing strategies help platforms attract buyers and sellers, but other types of actors must be on board to generate value (Yoo et al., 2010) and attract complementors (Stallkamp & Schotter, 2018). Complementors can be described as actors that provide complementary products to the platform (Stallkamp & Schotter, 2018). Digital platforms are built over a modular architecture, i.e., they are structured around a core and its multiple peripheries (Gawer, 2014). This type of architecture offers generativity, a phenomenon described by Yoo et al (2010) as "a technology's overall capacity to produce unprompted change driven by large, varied, and uncoordinated audiences" (p. 9). This generativity is achieved by integrating innovations developed by others in the platform (Yoo et al., 2012), which means that the success of the platform's generativity depends on the number and heterogeneity of actors it can attract (Yoo et al., 2010). This type of architecture is also associated with the concept of convergence, which can be explained as combining previously separated components (Ciriello et al., 2018).

Application Programming Interfaces (API) and *Software Development Kits* (SDK) gain much importance with modular architecture. API allows external software developers to develop applications interacting with the platform and its software resources (Gawer, 2021). Usually, they become available to developers via SDK. Gawer (2021, p. 4) describes SDK as "important boundary resources that facilitate and streamline the app development process by providing developers with a set of software tools, developer libraries, APIs, documentation, code samples, and guides". By opening their API, platforms invite external consumers or programmers to participate in the platform's value-creating process (Constantinides et al., 2018). This results in developers increasing their capability of developing complementary innovations that are compatible with the platform, thereby increasing the platforms' functionalities outside of their area of expertise or in areas that are economically unattractive to them, which may result in increasing the perceived quality by the end-users (Hilbolling et al., 2019; Gawer, 2021). This decision, however, may compromise the control that leaders exercise over the platform, so platform leaders must decide between "generating third-party complementary innovation and maintaining control over the evolution of the platform" (Gawer, 2021, p. 4).

2.2 Ecosystems

The fact that digital platforms are structured in a modular way implies the study of the ecosystem surrounding them (de Reuver et al., 2018). One of the platform managers' main goals is to construct this programmers' ecosystem and other actors that will complement the platform (Nambisan et al., 2018). The word ecosystem, however, is not originally from the business domain. It was used for the first time in the biology field, in 1937, by Arthur Tansley, a British ecologist. James F. Moore, in 1993, was one of the first to bring this word to the management domain, proposing it as a "loosely connected business community made up of different levels of organizations that share a common goal and co-evolve with each other" (Rong et al., 2015a, p. 42).

The world we live in is increasingly becoming more internet-based, with platformization and a growing tendency to digitalization. This means firms must change their value proposition to engage better with all the actors involved in their platform, whether they are clients, partners, or suppliers (Deloitte, 2021). Selander et al. (2013) distinguish the concept of a digital ecosystem, describing it as the "collective of firms that are inter-linked by a common interest in the prosperity of a digital technology for materializing their own product or service innovation" (pp. 184-185). The nature of the actors involved in the ecosystem concept is not consensual among authors and has been evolving throughout time. Iansiti and Levien (2004), relating to the traditional companies' ecosystem, include, among others, financing institutions, regulatory agencies, and media. More recently, and relating to digital platforms, authors like Helfat and Raubitschek (2018) and Simões (2019) extended the ecosystem concept to actors that interact with the digital platform without being part of it, like political institutions and legislators so that it can become as comprehensive as the concept associated to biology.

Deloitte (2021) distinguishes the business model of an ecosystem platform as being all "about driving connections between consumers and producers in an ecosystem" (p. 8). Platforms that are organized this way extend "beyond their core offerings that gave rise to the original, making connections between consumers and producers whilst facilitating the exchange of value" (Deloitte, 2021, p. 12). The number of actors to include in the platform must be chosen carefully since it may become too complex and with too many conflicts of interest associated (Hagiu, 2013). Generically, we can say that there are three

different types of actors associated with the platform's ecosystem: the platform leader; the actors around the platform, like complementary assets suppliers; and input suppliers for the platform leader (Helfat & Raubitschek, 2018).

It is up to the platform leaders to ensure the full functioning of the ecosystem. They should implement diverse governance mechanisms to boost the value creation mechanisms between them and the non-central actors of the platform (Hein et al., 2020). The leaders may translate these governance mechanisms into control mechanisms to ensure that all the developed extensions are interoperable and match the platform's interests (Tiwana, 2015). Hagiu (2013) refers that platform leaders must create governance rules that reply to the following question: "What are the "market failures" that would prevent our ecosystem from functioning properly (or even lead to its collapse)?" (p. 10). These rules will influence the behaviour of the actors involved in the platform (Jacobides et al., 2018). The fact that the ecosystem is open or closed, with firmly established rules or not, for example, may attract or ward off potential complementors that may have wanted to enter the ecosystem. The management of these connections is essential to introduce new opportunities to the platform and avoid risks associated with innovation (Hillbolling, 2018).

Digitalization helps the various participants of the ecosystem interact, allowing the integration of many other actors that may be complementary to the focal firm's activity (Parker et al., 2017). The non-central actors enter the platform's dynamics through the API and SDK enabled by the leaders (Um et al., 2013). Selander et al. (2013), reflecting on this type of actor's role in the ecosystem, refer that even though these actors are essential to the platform's generativity, they should not focus all their efforts on a single ecosystem. It becomes essential to have Governance mechanisms to ensure that there is still a collaboration, i.e., that these actors will continue to deliver value to the ecosystem (Gawer, 2014). This type of mechanism is essential to manage the role of external complementors. The decision to include this kind of external actors in the platform follows the logic that the platform grows quicker if there is no need to follow hiring or training processes (Parker et al., 2017). However, since these actors will focus on multiple ecosystems simultaneously, applying the proper mechanisms to ensure what Walley (2007) refers to as *coopetition* is necessary.

In case the Governance mechanisms implemented by the platform leader cannot assure collaboration, there will be too much competition between the actors, and that can undermine the ecosystem's value creation (Gawer, 2014). That is why there must be a good balance between competition and cooperation to guarantee the ecosystem's success (Hannah & Eisenhardt, 2018). One of the phenomenon that distinguishes platform ecosystems is value cocreation (Thomas et al., 2014). This phenomenon is described by Basole et al. (2015) as the "continual realignment of synergetic relationships of knowledge, resources and talent" (p. 2). It guarantees that the ecosystem grows and becomes more resistant to change, both on the inside and the outside (Basole et al., 2015). The generativity of digital ecosystems and the platforms' inherent logic of satisfaction maximization through the network effects between users and producers are pointed out by Sussan and Acs (2017) as crucial for the ecosystem's value co-creation. Besides the value cocreation, Hannah and Eisenhardt (2018, p. 2) identify three other features that distinguish ecosystems: "ecosystems are organized around a final product such that their components are complementary"; "Bottlenecks (…) constrain the overall growth or performance of the ecosystem due to poor quality, weak performance, or scarcity"; "firms in the ecosystem balance cooperation to create value and competition to capture value". Platform ecosystems must leverage production, innovation, and transactions to create and appropriate value, managing to get specific benefits of the system by creating and sharing assets and systems (Thomas et al., 2014).

2.3 Internationalization

2.3.1 The internationalization theories and platforms

The internationalization of companies is a widely studied subject that motivated the emergence of theories and models that seek to explain it. The rapid development of digital technology and the appearance of new business models, like platforms, have challenged the classic theories of companies' internationalization (Wittkop et al., 2018), leading researchers to question if the traditional theories can explain their internationalization process (Stallkamp & Schotter, 2018; Chen et al., 2019). Some authors, like Oviatt and McDougall (1994) or Knight and Cavusgil (2004), have questioned the Uppsala Model (Johanson & Vahlne, 1977), reporting the emergence of some types of company, the *International New Venture* or *born-global*, that do not internationalize like this model suggests (Knight & Liesch, 2016; Coviello et al., 2017). Other authors, like Monaghan et

al (2020), reveal some openness to the use of these theories as explanatory to this phenomenon, arguing that some points on these theories can be used as starting points for explaining platforms' internationalization. This literature review will follow Monaghan et al.'s (2020) perspective on platforms' internationalization. However, what do the classic theories on internationalization say?

The Uppsala internationalization model (Johanson & Vahlne, 1977) affirms that companies' internationalization is phased, having first the tendency to internationalize to more culturally, economically, and politically similar countries, gradually moving to less similar countries. Johanson and Vahlne (1977) name these factors the psychic distance. This phased entry into new markets forces the company to initially use less resource-compromising entry modes, using bold methods as they gain knowledge on the new foreign market (Johanson & Vahlne, 1977). The psychic distance makes the companies face the *liability of foreignness* (LoF) (Johanson & Vahlne, 1977), i.e., the risk of developing businesses in a different country due to the impact of the psychic distance in the company's operations, mainly when they compete with local companies that are not affected by it (Rugman et al., 2011). In a more recent model, Johanson and Vahlne (2009) focus mainly on the concept of *liability of outsidership* (LoO), which the authors describe as the lack of access to resources due to the lack of integration in networks or ecosystems with the actors of the country where the company will internationalize.

The internalization theory (Hennart, 1982; Rugman, 1981; Stallkamp & Schotter, 2018) suggests that companies internationalize to exploit their *Firm-Specific Advantages* (FSA) in other territories, using these to surpass LoF and LoO (Johanson & Vahlne, 1977; Johanson & Vahlne, 2009; Vahlne, 2020). The FSA are defined by Grøgaard and Verbeke (2012) as the "strengths of the company relatively to those of the opponents, that allow its survival, profit and growth" (p. 8). The FSA arise when companies can develop a type of knowledge or capacity that is exclusive, and that can only be imitated by rivals in the long run and with high costs (Rugman et al., 2011). These FSA can either be *location-bound* (LB FSA) or *non-location-bound* (NLB FSA) (Rugman et al., 2011). The LB FSA are strengths of the company that cannot be transferred outside its' limited geographical area of operation (Rugman et al., 2011). A company's reputation in a specific location or the networks with local actors can exemplify LB FSA. By contrast, the NLB FSA are the company's strengths that can be easily transferred to other geographical areas (Rugman

et al., 2011). It can be, for example, the knowledge a company has on a particular patented technology. The companies' FSA can be exploited internationally in diverse ways, for example, through licensing agreements with the companies of the destination country or by establishing subsidiaries in that country, internalizing their international activities (Rugman et al., 2011; Grøgaard & Verbeke, 2012; Stallkamp & Schotter, 2018).

What changes, then, from the internationalization of the classic Multinational Enterprise (MNE) internationalization to platform internationalization? On the review of their internationalization model, Johanson and Vahlne (2009) write that the "firm's problems and opportunities in international business are becoming less a matter of country-specificity and more one of relationship specificity and network-specificity" (2009, p. 1426). Freeman et al. (2010) share the same vision, referring to the importance of the establishment of networks that allow knowledge transfer and absorption in the internationalization process. Networks contribute to the provision of value and resultant innovation of platform-based firms, playing a decisive role in enabling firms to access know-how and knowledge that is not internally available to them (Zeng et al., 2019). The internationalization of this new kind of company seems to be more focused on the LoO than on the LoF, contrary to what happened with the classic MNE. Brouthers et al. (2016) affirm that platforms face lower LoF risks since the costs of transferring the platform from one country to another are relatively low. Yonatany (2017) takes the same position, also referring that platforms are less influenced by psychic distance to the foreign market, making establishing easier and quicker.

Platforms deal with a bigger LoO than the classic MNE (Brouthers et al., 2016; Simões, 2019). Although embedded in the digital context, platforms still feel the effect of borders between countries (Stallkamp & Schotter, 2018). Chen et al. (2019), researching the internationalization of mobile apps, show that geographical borders limit network externalities. Shaheer and Li (2020), just like Simões (2019), point out that, besides the geographical drivers, also cultural, administrative, and economic drivers (the CAGE drivers), are essential for the adoption of platforms in the markets where they want to internationalize, and therefore can stop the digital internationalization. For example, the users of a certain country may prefer to only interact with other users of the same country or cultural group (Stallkamp & Schotter, 2018). However, the fact that they are embedded in the digital means allows them to interact directly with their users (Almeida,

2020; Monaghan et al., 2020). Therefore, platforms can internationalize in a different way than the one idealized by Johanson and Vahlne (2009), emphasizing the need to build and manage relationships to enter foreign markets (Almeida, 2020; Monaghan et al., 2020).

2.3.2 The role of ecosystems on internationalization

Thanks to the network externalities, the users' networks are a platform FSA (Stallkamp & Schotter, 2018), given that "a platform with a large existing user base can generate more economic value than rivals with smaller networks" (Stallkamp & Schotter, 2018, p. 66). Stallkamp and Schotter (2018) suggest that the traditional externalities typology, *direct* and *indirect*, can be expanded to an international dimension, distinguishing them as *within-country*, *cross-country*, or *insignificant*. Food delivery platforms, like Uber Eats or Bolt Food, benefit from *indirect within-country* network externalities, given that the platform allows interactions between restaurants and clients in the country itself and in a limited geographical area. However, communication platforms like WhatsApp and Viber have *direct cross-country* network externalities, given their growing use for international communications (Stallkamp & Schotter, 2018; Telegeography, 2017). The gaming platforms, like *Steam* and *PlayStation*, combine *direct* and *indirect cross-country* externalities because of their online multiplayer mode (Stallkamp & Schotter, 2018; Almeida, 2020). More recently, Guillén (2021) suggested that these network effects do not have to be necessarily global but can also be felt locally or regionally.

Platforms are not all the same. There are platforms more favourable to direct network effects, like WhatsApp, and platforms that benefit from indirect network effects, like eBay (Stallkamp & Schotter, 2018; Almeida, 2020). The last paragraph allows us to understand that there are also differences with the international scope of network effects: there are platforms, like the delivery services, whose business model allows them only to have *within-country* network effects, opposite to the social media business model, which allows them also to have *cross-country* network effects. With purely digital platforms (Simões, 2019), once they are not connected to physical components, there is no need for proximity between users and the different actors that complement the platform (Almeida, 2020). Almeida (2020) exemplifies with Google, a technological giant that, in theory, can use all its strength and data centre capacity to establish itself in another country. With food delivery platforms, for example, they must build an ecosystem with local partners to guarantee that the meals are delivered to their clients. Food delivery platforms perfectly

exemplify Stallkamp et al.'s (2022) findings, which reveal that non-digital resources play an essential role in the internationalization of most digital platforms. Therefore, we can say that the distribution of network effects around the world is not homogeneous (Stallkamp & Schotter, 2018; Chen et al., 2019; Simões, 2019; Almeida, 2020).

The delivery platforms, however, are not the only type of platforms that requires building a local ecosystem (Simões, 2019). This is a common feature of all platforms, but the complexity of the process depends on each platform's singular characteristics (Simões, 2019). Brouthers et al. (2016) refer that developing a local ecosystem is fundamental for the international replication of the business model since it is not common to transfer actors that belong to the ecosystem between countries. The challenge to most of the platforms is not only to attract suppliers and clients to the ecosystem but also complementors (Simões, 2019). These complementors may be less sophisticated, like the Uber Eats riders, or more sophisticated, like the Twitter programmers that translate the social network to the language of the countries where it is available (Ojala et al., 2018). Ojala et al. (2018) see the participation of these local actors in the ecosystem as crucial for a successful internationalization process, allowing the platform to align the interests of these local partners with their own. Simões (2019) also includes political actors in this local ecosystem, given that they can help draw a legal frame favourable to establishing a platform in a country, helping to avoid situations like those with Uber and Airbnb in Portugal. Rong et al.'s (2022) research proposes a new concept, the *Liability of Ecosystem Integration*, that is referent to "the costs and challenges that foreign firms encounter when catalysing and developing a necessary local ecosystem of stakeholders" (p. 1).

Parente et al.'s (2018) research shows how the mobile internet field may benefit from using an internationalization strategy linked to the business ecosystem. The authors refer that many stakeholders from other fields, like mobile payments, will contribute to the platform, varying from country to country. That is why Rong et al. (2018) refer that platforms, besides having to deal with LoF, they will also have to face the *Liability of the Foreign Ecosystem*. Yonatany (2017) concludes that a platform that uses an internationalization strategy linked to the business ecosystem incurs a smaller LoF, internationalizes quicker and is less influenced by the psychic distance than a company that internationalizes the traditional way. Rong et al. (2015), describing the internationalization of a semiconductors company in China, explain that the process was

only successful due to the company finding partners in that country. The phenomenon extends to digital platforms, like Uber and eBay, whose internationalization process to China failed since they did not try to find any partners to work within that country, which resulted in the failure of their internationalization process: Uber ended up being bought by Didi, while eBay had to abandon the market because of Alibaba (Rong et al., 2018). Partnerships are crucial to develop business ecosystems, increasing the local competitiveness of platforms, and leveraging its internationalization and its partners' (Almeida, 2020).

The fact that platforms organize in an ecosystem also challenges the theory of internalization. The focus on platforms' FSA may not be justifiable given that when they organize in an ecosystem, the origin of the innovation may be one of the complementors and not necessarily the platform leader (Parker et al., 2017; Li et al., 2019)). Such affirmation is supported by Hilbolling et al. (2019), that refer that when companies share knowledge in collaboration structures, they are able to develop better innovations than when they are based only on their internal knowledge. It is more logical and valid, then, to talk about *Ecosystem-Specific Advantages* (ESA) and not FSA (Li et al., 2019). The term ESA is composed of three related components: the actors present in the ecosystem, the positive network effects they generate, and the ecosystem's Governance (Li et al., 2019; Almeida, 2020).

The lack of capacity by the platform leaders to process information may undermine its ability to react to the way relationships between the different participants of the local ecosystems may vary from country to country (Li et al., 2019). In order to successfully exploit their competitive advantages internationally, platforms are often required to integrate their digital capabilities and knowledge drawn from external contexts (Rong et al., 2022). As it was mentioned before, the non-central actors of the platforms do not focus exclusively on a single ecosystem, which can result in them abandoning it (Selander et al., 2013). These situations may affect the whole ecosystem, damaging the ESA (Li et al., 2019). The cost of transferring the ESA to other countries "consists in realigning the contributions of ecosystem participants without suffocating their commitment to innovation or discouraging them in other ways." (Li et al., 2019, p. 9).

The classic internationalization theories suggest that companies use the entry mode in a foreign country that maximizes their FSA (Hennart, 1982; Rugman, 1981; Stallkamp &

Schotter, 2018). With platforms, the bottlenecks may represent barriers to entering foreign markets (Li et al., 2019). The platform's strategy is usually to occupy that bottleneck, using its market power to coordinate the participants in the ecosystem (Gawer & Henderson, 2007; Li et al., 2019). The bottlenecks usually dislocate along positions over time, and being the platforms dependent on digital technology, it is expected that they see specific locations as more attractive to internationalize (de la Torre & Moxon, 2001; Li et al., 2019). Therefore, the transfer of ESA is affected by the location and the bottlenecks, making its identification crucial to understand the way and why the company internationalizes (Li et al., 2019).

3 Research Questions

This dissertation aims to understand how incorporating complementors in new local ecosystems affects the platform's performance, locally and internationally. The literature review provided in the previous chapter intends to give knowledge about digital platforms and their main features and typologies, the importance of ecosystems to digital platforms, and their internationalization behaviour. Recent studies about digital platforms explore their internationalization, relying on multiple occasions in the classic internationalization theories and on its specific terms (Brouthers et al., 2016; Chen et al., 2019; Stallkamp & Schotter, 2018; Simões, 2019; Almeida, 2020). However, Li et al. (2019) introduce a new term specifically for digital platforms' internationalization, the ESA. The ESA concept is recognized by Verbeke and Fariborzi (2019, p. 1441) as "a critical addition to those already established". The investigation of the ESA becomes relevant due to the ecosystem way that digital platforms predominantly use, which results in the possibility of innovation introduction on the platform by any of its participants (Li et al., 2019).

What does a local ecosystem, and more specifically complementors, mean for platforms, their functioning, and the value they deliver? When platforms internationalize, what does it mean for platforms that their *location-bounded* complementors from other local ecosystems cannot participate in the new local ecosystem? Can the presence of new local complementors give new features to the platform that it can use in that local market? This dissertation approaches these questions by formulating three research questions: Q1, Q2, and Q3.

The presence of complementors in the platforms' ecosystems is essential to deliver innovation and allow its proper function. Recently, Li et al. (2019) related complementors as essential for the platform's value delivery and differentiation, suggesting a new term for digital platforms, ESA, to replace an already existing one, FSA. It is not, however, developed in literature how exactly complementors contribute to the value creation process in platforms. So, the first research question is:

Q1: How do platforms perceive the influence of local complementors in their FSA?

The presence of complementors in the platforms' ecosystems is essential to deliver innovation and allow its proper functioning. Local complementors, however, can also help the platform in its internationalization process by helping it explore its ESA in other markets. So, the second research question is:

Q2: How does the inclusion of local complementors affect the internationalization process?

When a platform internationalizes, the new local complementors may give the platform new features that help it be more fit for the new users. These features may help the platform overcome geographical and cultural differences, helping its implementation in the new market. So, the third research question is:

Q3: How do local complementors help the platform's successful implementation in the new market?

4 Methodology

This chapter provides a general view of the methodology used to approach the empirical part of this dissertation. Using a case study methodology, it approaches digital platforms established in Portugal to explore the impact that new local actors have on the platform's ESA. This chapter is divided into three sections. The first section explores what case studies are and why it was the chosen methodology for this research. The second section explains the underlying rationale behind this study's selection of cases. The third section addresses the data collection, and the fourth section, finally, the validation process.

4.1 Why case studies?

Eisenhardt (1989) defines a *case study* as being a "research strategy which focuses on understanding the dynamics present within single settings" (p. 534). This methodology is the most appropriate when addressing questions of "how" and "why" (Yin, 2003; Nevado, 2009), when there is little control over events by the researcher and when the focus of the research is on a contemporary phenomenon in a real-life context (Yin, 2003). It allows a more detailed and precise analysis by contacting directly with the involved agents, which enables the investigator to notice some details that would otherwise be more likely to be ignored (Miranda, 2018). Case studies have been increasingly used in International Business (IB) research (Ghauri, 2004; Welch et al., 2011), having multiple examples as references of this dissertation's literature review, like Johanson & Vahlne's Uppsala Internationalization Model (1977), Ojala, Evers and Rialp's research on digital platforms (2018) and the INV phenomenon and Almeida's thesis on partnerships and their role on the internationalization of digital platforms (2020).

Eisenhardt and Yin have pretty different takes on the case study methodology. While Eisenhardt (1989) sees case studies as most appropriate for the initial stages of research, Yin (2003) does not restrict them to such an early stage in the process. For Yin, case studies "are suited to verification and not just discovery of new theory" (Welch et al., 2011, p. 746). Yin's perspective is more suited to this thesis' objectives, given that explanatory case studies (Yin, 2003) "use deductive logic to test propositions, adjudicate among rival explanations and establish causal relationships" (Welch et al., 2011, p. 746). Explanatory case studies also intend to reveal the "how and why of an actual phenomenon in its real context and to which the investigator hasn't contributed" (Nevado, 2001). That is why it was decided to develop an explanatory case study.

Yin (2003) justifies a single-case design choice when the research is on an unusual, rare, or critical case. Yin (2003) himself, however, refers that this design is more justifiable when dealing with an unusual, critical, or revelatory case, which is not the case here. That is why a multiple-case design choice has been made to deepen the knowledge of this phenomenon and explore a replication phenomenon present in these cases (Yin, 2003).

4.2 Case selection

To deploy this case study, it was decided that multiple platforms would be studied, so the results could have a broader expression while allowing them to be easier to compare, which would not be the case if a single company was studied (Yin, 2003). The following criteria were chosen for selecting the cases: (i) digital platforms, (ii) with an established ecosystem in Portugal, (iii) with an established ecosystem in at least one other country, and (iv) that could not transfer all its complementors between local ecosystems. According to Miles and Huberman (1994), there are four parameters one should consider when choosing the cases to study: the target; the actors; the events; and the processes. This information can be found in Table 1.

Table 1: Definition of study parameters

Parameters	Description
Target	Digital platforms with an established ecosystem in Portugal and overseas
Actors	Strategy executives
	Operations executives
	Marketing executives
Events	Platform internationalization
	Platform local ecosystem
Processes	Platform creation
	Local ecosystem creation
	Establishment abroad
	Development of activities abroad

Source: Developed by the author, based on Miles and Huberman (1994) and Martins (2016)

The initial goal of the research was to study platforms with an established ecosystem in Portugal and overseas that weren't able to transfer all its' complementors from one ecosystem to another. Among a list of potential platforms, three were identified as the most fitting for serving the purpose of this dissertation: Aptoide, Zomato, and OLX. The primary deciding factors for choosing these platforms over the others were: their international reach; their popularity among Portuguese users; and the fact that the three had offices in Portugal. Contact was established with the three platforms via e-mail in May. It was impossible to schedule a meeting with OLX due to calendar issues, but Aptoide and Zomato have agreed to participate in this dissertation.

4.3 Data collection

Collecting, organizing, and understanding data can, as Nevado (2009, p. 9) describes, "create the idea of diving into a big mass of information that asphyxiates us". In order to maintain the reliability of this process, this dissertation followed the three principles described by Yin (2003): using multiple sources of evidence, like semi-structured open interviews, public documentation, and archival records, in order to triangulate the data collected; creating a case study database, in which all the collected data was organized and saved; and maintaining a chain of evidence, allowing external observers to trace the steps made in this dissertation. Some sources on social media were also used; however, they were handled cautiously, and all the information was carefully double-checked.

Archival records and public documentation have been obtained online and via newspaper articles. The data collected was, most of all, archived interviews, news articles, company communications, and recorded talks and presentations. A list of the sources used for triangulation is available on Appendix A5. They were collected during the process of desk research, before the interviews, to enhance the knowledge on these companies and to support the questionnaire and the interviews. The interview guidelines were adapted from Martins (2016), Miranda (2018), and Almeida (2020), and it was designed for semi-structured interviews with a mix of open and closed questions (see Appendix A1).

This study's primary source of information is interviews, the most common source of information for case studies (Yin, 2003). Regarding Aptoide, the interviewee was Paulo Trezentos, the platform's co-founder and CEO. On behalf of Zomato, Nuno Fernandes, the platform's General Manager and Head of Growth was the interviewee. Both interviews were conducted remotely, and all interviewees could freely express their points of view on each subject. They were conducted in Portuguese in September 2022. Both conversations flowed in a semi-structured way, having not lasted more than 40 minutes. The interviews were recorded with the interviewees' consent to make the transcription process more accessible and reliable. A table regarding both interviews and firms is presented in Appendix A3.

4.4 Data validity

Yin (2003) refers four tests to establish the quality of the research made: construct validity, which refers to "establishing the correct operational measures for the concepts being studied" (p. 34); internal validity, related to the establishment of causal relationships with certain information leading to other information; external validity, which demonstrates the generalizability of the findings; and reliability, which demonstrates that if the study is repeated it will have the same findings. This study's data validity framework was adapted from Yin (2003) and Almeida (2020) and can be found in Table 2.

Table 2: Data validity framework

Tests	Case Study Tactic
Construct validity	Data triangulation achieved by combining documentation, archival data, and interview data Complete review of the research by the supervisor Detailed explanation of how the data was collected
Internal validity	Research framework derived from literature Theory triangulation by combining different theoretical perspectives Identification of patterns between the units of analysis studied
External validity	Explicit rationale for choosing case studies (chapter 4.1) The context of each unit of analysis is detailed (chapter 5) Analysis between cases is assured by combining information from the different units of analysis
Reliability	Information on each organization's names and background is given (chapter 5) Explicit interview guidelines with both open and closed questions (appendix A1) Creation of a case study database (which can be provided if requested) Creation of a case study protocol (Appendix A2)

Source: Developed by the author, adapted from Yin (2003) and Almeida (2020)

5 Case Presentation

The present chapter briefly introduces both firms being studied in this dissertation, as this research methodology requires a certain level of knowledge of the units of analysis. The first section focuses on Aptoide, while the second focuses on Zomato.

5.1 Aptoide

Aptoide was founded in Portugal in 2011 as the spin-off of a summer internship project organized by Caixa Mágica in 2009. The initial idea back in 2009 was to develop an app market for Android, having grown to an open-source solution for the, by default, monopolized app distribution market. Like YouTube, users can create their own channels with their videos, in Aptoide users can create their own app stores with selected apps from the central store and then share them with other users. In terms of payment, Aptoide was the first app store to have its own cryptocurrency as an in-app payment method. AppCoins were created in 2018 and were the first Portuguese cryptocurrency to enter the market. The Initial Coin Offering was held at the 2017 Web Summit and was negotiated with a base value of 10 cents a dollar. When they reached the market in 2018, they registered a market value of 800 million dollars within its first 24 hours of negotiation, being considered one of the 50 most powerful cryptocurrencies of that year.

Aptoide is not only a B2C platform but also a B2B platform in the way that it allows other businesses to create their own customizable App Stores in terms of content and brand image through API or co-brand solutions. Its ecosystem includes apps and videogames users and developers, integrators, investors, and original equipment manufacturers (OEM). Besides providing apps to smartphones and tablets, Aptoide is also available for TV and has joint ventured with cars components manufacturer Faurecia to adapt the app store content to the automobile experience. It has already contracted with Mercedes-Benz, Volkswagen, and BMW.

The platform's first version was developed in Portuguese, having later developed a version in Spanish and, after that, in English. Having been such a success in the Iberian market, and with the growing number of users and actors in the ecosystem, Aptoide started expanding to Latin America, influenced mainly through word-of-mouth among the Iberian users' community. From inception to 2015, the platform's main markets were Brazil, Mexico, and the USA. The main reason for Aptoide's growth in those markets where its features, like the diversity of content, are unable to be found in other app stores and the possibility of creating an app store inside Aptoide and share it with the community.

In 2015, the founders decided to expand to the Asian market, even though the initial primary focus was the European and North American markets. This shift in the platform's strategy was decided after market studies revealed a significant increase in smartphone users in Asia. In 2016, the platform was the first European start-up to raise funding from Gobi Partners from China, and Golden Gate Ventures from Singapore. The total funding was 4 million dollars, which Aptoide used to develop its operations in Southeast Asia, opening offices in Singapore and Shenzhen, China. The main reason for opening the office in Singapore was to help the platform expand to the Indian and Southeast Asian markets, where they had grown 200% the year before. In Shenzhen, the main goal was for Aptoide to bond with Chinese OEMs (Original Equipment Manufacturers) that either operated in an outsourcing regime for the most prominent brands or that have their own brands. Regional partnerships were created with OEMs like Xiaomi and OPPO, allowing the platform to be pre-installed in various mobile equipment. The establishment of contacts kept building and, a few years later in 2019, after Google stopped providing services for Chinese mobile phone brands, Aptoide and Huawei showed some interest in partnering to replace Google Store in their products. Although this partnership never saw the light of day, it reflected Aptoide's success and perceived quality in the Southeast Asian market.

Today, according to the platform, Aptoide is one of the world's most successful independent app stores, with 300 million users worldwide, 7 billion downloads, and 1 million apps available in the app store.

5.2 Zomato

Zomato is a multinational restaurant aggregator and food delivery platform that aims to connect customers, restaurant partners, and delivery partners. It provides factual information on menus and user reviews of the restaurants, order food, book a table and make payments while dining out at restaurants. On the other hand, the platform provides restaurants with industry-specific marketing tools to help them engage and acquire customers to grow their businesses and provide an efficient delivery service. The platform was established in 2008 under the name FoodieBay, by two IIT students from New Delhi, India. The idea emerged when the founders came across their co-workers in the office they worked at, waiting a long time to get a flash of the menus to order food for lunch. That was when the founders thought of converting the menus into a digital app. In 2010,

the platform was rebranded as Zomato. Expanding internationally started seeming an inevitable part of the platform's future when it started establishing itself in India. The founders desired to expand from this country to others because they found the need for this type of product worldwide. Zomato always does a miniaturized launch before entering a new market: it collects information on possible partnerships and engages with users by showing them the product. The platform is usually launched in the main city of a country, and then it naturally expands to other cities as the platform earns popularity among the communities.

The history of Zomato's launch in Portugal began when Miguel Ribeiro, former Country Manager of Zomato Portugal, contacted Deepinder Goyal, Zomato's founder and CEO, through LinkedIn during a train trip. Twenty minutes after that first message, they were both talking through Skype. That was when Miguel was invited to join Zomato in the Indian office to help the company draw a strategy that would elevate them to a global scale, to which he immediately replied yes. In December 2013, Miguel prepared to launch Zomato in Portugal. The platform was officially established in Portugal in 2014, with a team of only 12 people. The establishment process was difficult: the platform was relatively unknown in Portugal, and the team didn't even have a prototype of the app to show the establishments, only a leaflet explaining what Zomato would be. That complicated the process of finding cafés, bars, and restaurants available to cooperate with the platform. Some establishments even thought they were the police for trying to take pictures of the menus to later include on the app. These problems eventually got solved, and the platform began to expand, mostly thanks to its big community of users, mainly bloggers and influencers, which helped popularize the platform among the general audience.

The platform began its operations in the Lisbon area, having later expanded to Porto, Algarve, and, since 2022, in all cities and regions in continental Portugal and the Madeira and Azores islands. In 2020, with the covid-19 pandemic, Zomato decided to restructure how they organize, giving more independence to each local office. That helped Zomato Portugal rethink its operations since relying solely on restaurant evaluations and table reservations during the pandemic period was not feasible, with lockdowns and local restrictions to how restaurants could work. The platform decided to enter the food delivery market, partnering with CTT, the Portuguese post office, to ensure delivery.

Zomato saw this partnership as the most logical since the local post offices in a country are the ones most accustomed to a region's geography, but also because of its total coverage of the Portuguese territory. In 2022, Zomato Portugal decided to create an exclusive app for the Portuguese market, where it is possible to order food, make table reservations and leave evaluations on restaurants. As of today, the platform reaches fifty-three thousand restaurants through the app.

6 Cross-case Analysis

This chapter presents the information gathered from the cases. The first section compares both platforms' functioning and international context. Next, it explores if the international expansion of the platforms is compromised if they join new actors in the local ecosystem. Then, it focuses on how the actual internationalization process may have been different due to the incorporation of these new local actors. Finally, it approaches how the inclusion of the new local actors may have affected their performance.

6.1 Contrasting the cases

Aptoide and Zomato differ in the way they perceive ecosystems and their ESA. Three important contrasting factors have been identified that go beyond the contrast between each platform's industry. A table summarizing these differences can be found in Appendix A4.

Aptoide can be defined as a born global. This means that since the beginning of its operations, the platform has sought to obtain a substantial part of its revenue from the sale of its products in the international markets. The platform has always been thought of in the international context, having repercussions on how it thinks about its operations and ecosystems. Zomato, on the other hand, does not fit this concept. Although there was always a desire for internationalization, the initial focus of the platform was the Indian market, having then been established in various other countries.

The tangibility of its operations is also a contrasting factor between both platforms. Aptoide is a purely digital platform, while Zomato's operations have a physical component attached to them. In Aptoide's case, this means that users can access all the platform's intended value regardless of their location. In contrast, Zomato relies on the geographical proximity between users and restaurants to ensure deliveries since the

product of this interaction is physical. This means that Aptoide's network effects are less affected by geographical borders than Zomato's.

Since both platforms have a different dependency on geography, they perceive their ecosystems in an opposite way. Aptoide has two local ecosystems associated with its offices in China and Singapore. However, the platform does not have a relevant user base in these countries. In fact, the platform does not even operate in China. These ecosystems serve a global purpose other than a local purpose. The platform can enjoy the effects that the interaction between the platform and the local actors generates globally, allowing users from all over the world to benefit from them. On the contrary, Zomato needs to have a local ecosystem in each country the platform operates. This is easily understandable if we think that the primary interaction that happens in Zomato is between users and restaurants, and this interaction has a limited geographical scope.

6.2 Case study findings

6.2.1 How do platforms perceive the influence of local complementors in their FSA?

Zomato perceives itself as being a two-sided platform. The main interaction that occurs in the platform is between users and restaurants. Having started as a restaurant listing platform, users assumed a determinant role in the platform. Not only do they give value to the platform by using it, giving plenty of data points, so Zomato understands search and geographical patterns, but they also, according to Nuno Fernandes, "*are the main generator of content to the platform*", serving as a gatekeeper to it. Users have a determining role in listing restaurants and correcting outdated information on the platform. This happens because, according to Nuno, "*it's much easier for a million users spread all over the country to understand that that menu is outdated, if a new restaurant has opened around the corner in a certain city, than for a team of 30 people*". Users assume a central role in Zomato's value creation and activity, just as much as restaurants. Restaurants are the leading provider of Zomato's services, meaning that the bigger the number of restaurants the platform can get on board, the bigger the number of users willing to join the platform. As the platform aggregated more services, like the possibility to pay via the app and delivery services, Zomato could not rely solely on users and restaurants, so it had to bring new complementors on board. Unlike the competition,

Zomato did not have a global partner for payments. The solution was to go local, differentiating itself from the other platforms. SIBS has been essential in ensuring users can pay for their meals via the app. Regarding deliveries, Zomato wanted to differentiate from its competitors. Instead of relying on a network of independent riders, Zomato decided to partner with the local partner CTT. Nuno sees this partnership as fundamental to give the value the platform intended because "*CTT have the knowledge and a market positioning that makes it have high-quality standards*".

Aptoide also perceives itself as a two-sided marketplace. At each end of the dyad, we can find users and videogames developers. For Paulo Trezentos, "*being a two-sided marketplace, the more elements it has on the network, the more value the platform has*". The platform is open, makes API available, and has light restrictions for entrance to both users and developers, which helps to create a feeling of independence, one of the distinctive features seen by Paulo as crucial for Aptoide. For this feeling of independence also contributes the fact that the platform is not one of the *GAFA* (Google, Amazon, Facebook, and Apple), which creates a feeling of safety and reliability for some users. The platform has two offices outside Portugal, in Shenzhen, China and in Singapore. Each of these offices has a local ecosystem associated: in Singapore, this ecosystem is composed mainly of investors; while in China it comprises mainly game developers and OEMs. As complementors, OEMs contribute to the massification of the platform worldwide. Agreements with brands like OPPO, VIVO, and Xiaomi have allowed Aptoide to be preinstalled on these brands' mobile devices, which has helped the platform gain users worldwide. The inclusion of Chinese game developers in Aptoide's ecosystem is of main importance to the platform, as they increase the platform's value perception in the eyes of the users, related to their opponents. It's not usual for these developers to be included in *GAFA*'s ecosystems, so it gives Aptoide a certain feeling of exclusivity, and nurtures that feeling of independence so important for the platform. The contribution of these complementors serves mainly a global purpose other than a local one. As Aptoide can transfer its' network effects beyond borders, users worldwide can enjoy the effects generated by including these new complementors.

Answering the first RQ, both platforms perceive the inclusion of complementors in their ecosystem as being important. When platforms include complementors in their ecosystems, they expect to benefit from certain features that will help them deliver value

and satisfy the end user's needs. Complementors can help platforms explore new business opportunities, reach customers in markets where the platform was not established, and increase the accessibility to their users. It is also important to highlight the importance users have on platforms that rely heavily on their local ecosystems, like Zomato, by being the main content generator for the platform and, this way, helping it to differentiate from the competition. Thanks to these interactions between complementors and platforms, both platforms can achieve their FSA. For Zomato, without the inclusion of local complementors, it would be impossible for the platform to operate in Portugal. Choosing the right complementors has given the platform a standard of quality and fitness for the Portuguese audience. In Aptoide's case, including developers and OEM from China has helped it nurture the feeling of independence that the platform perceives as unique relating to the competition.

6.2.2 How does the inclusion of local complementors affect the internationalization process?

Back in 2014, when Zomato established in Portugal, the platform was solely dedicated to restaurant listing. For this feature, the ecosystems Zomato had in other countries were composed mainly of users and restaurants. As it can be logically understood, these users and restaurants were not transferrable to the newly built Portuguese ecosystem. In terms of engagement with users, in each country that Zomato was launched, there was a significant attempt to create proximity with the first users' community to guarantee that *foodies* had great proximity to the brand, that they were aware of what the brand was doing, and that they could share their feedback in a very close way. Nevertheless, as Nuno states, the Portuguese team "*didn't exactly have an implementation guide on how to activate these communities*", since the gastronomic culture in India differs from the one in Portugal. Nuno clearly refers that "*there weren't exactly any complementors that have carried over from other markets to the Portuguese market*", meaning that "*a lot had to be adapted, created, attempted, invented, and developed*". The same happened when Zomato integrated reservations, transactions, subscriptions, and delivery services onto the platform. There were no international partnerships to tell the Portuguese team that "*for reservations, this is the procedure we follow; for payments is this other; for subscriptions is that one*". This did not cause any constraints to the internationalization process of Zomato, only the "*natural feeling of doubt on whether it would work or not*". Including

local complementors like SIBS, Checkout and CTT was crucial to ensure the operability of the platform and the engagement with the new users.

Aptoide did not precisely need to replicate its ecosystem in other countries to pursue internationalization. By establishing offices and building ecosystems in China and Singapore, Aptoide was looking to establish global partnerships with the Chinese complementors that would give them a competitive advantage worldwide. As Paulo states, "*China has good developers, but it doesn't distinguish itself in terms of app engineering. It may be cheaper than Berlin, for example, but it's not cheaper or better than Lisbon, so it would never give us a competitive advantage*". The partnerships established in China, with OEM and developers, were always seen by Aptoide as having a global purpose other than a local one. Having Aptoide preinstalled in mobile phones has been a massive driver for the establishment of Aptoide abroad, particularly in Southeast Asia, a region where Chinese OEM brands have a significant share of the market. In this region, Google does not have the popularity it has in regions like Europe or North America, so it was fertile ground for Aptoide, with the right partnerships, to explore. Including Chinese developers in Aptoide's ecosystem also contributed to its' internationalization since it gave the platform videogames and apps that are not available in other app stores. The decision made by the USA to forbid companies like Google from doing business with certain Chinese technology companies has also boosted Aptoide's establishment in Asian countries since the platform offers an alternative to the banned services. The inclusion of car manufacturers in Aptoide's ecosystem is also expected to have repercussions in terms of internationalization and an increase in the number of users. By reaching an agreement with manufacturers like Mercedes-Benz, BMW, and Volkswagen to develop an app store compatible with their vehicles, Aptoide expects to increase its global reach.

Answering the second RQ, the complementors' impact on the internationalization process of platforms is strong, although with some differences. Zomato and Aptoide's examples make us understand that it is mostly thanks to complementors that platforms can establish themselves more firmly in foreign countries by increasing their users' reach and the perceived value of the platform. Regarding Zomato, the fact that no complementors from other ecosystems could be transferred to the Portuguese one made it crucial to engage with local partners to ensure the platform's functioning and value

proposal in this new market. Finding the proper mechanisms to engage with the new community of users and to ensure the right complementors for the services the platform has integrated was fundamental to internationalization. Being a born global, for Aptoide the inclusion of new complementors is not necessarily a requirement for internationalization. The platform does not need to create a new local ecosystem in each country it wants to operate, which means that, as Paulo states, "*the platform has always been thought of as being a global platform*". If engaging with new complementors was not fundamental for the platform to operate in new markets, it was to accelerate its' dissemination. The new complementors gave Aptoide vehicles of engagement with users, making it easier for the platform to gain popularity in certain regions of the world and to increase the platform's perceived value with new game developers unreachable by its competition.

6.2.3 How do local complementors help the platform's successful implementation in the new market?

When Zomato integrated reservations, transactions, subscriptions, and delivery services into the platform, there were no international partnerships that the Portuguese team could use for Zomato's operations in Portugal. By the time Zomato integrated these new functions onto the platform, it already counted with a significant user base in Portugal. For Nuno, brands often "*reach a point where you grow so much that your next step is clearly to customize and not to continue massifying*". The same happened with Zomato. Exemplifying with payments, interacting with SIBS and their payments solution MBWay made much more sense to the platform than establishing an international payments solution with PayPal since it is a solution that is more attractive to Portuguese customers. The same thing to meal cards, they are prevalent in Portugal, but do not have a relevant expression in other countries. Nuno believes the local solutions Zomato found are preferred to global ones because "*these solutions are closer to what the consumer wants*". Although Nuno recognizes that complementors are "*super important*" for the platform's performance in the Portuguese market, "*the main factor is strategy, (…) to look for highly renowned local partners with conditions that would benefit us all, instead of having a posture of exclusivity that some platforms have*". For Zomato, having a posture of healthy competition will result in "*users having a much better experience, restaurants being more profitable, because of Zomato and other platforms, and a more*

fruitful relationship with restaurants, to develop new functionalities in a more direct way".

For Aptoide, bringing new local complementors on board is not necessarily linked to the platform's performance in that specific market. The Chinese local ecosystem is an example of that. Although the platform has a local ecosystem in China, Aptoide has no users in this country. Paulo explains that this happens because "*China has over 100 app stores, so it can be described as a red ocean and has very strict regulation for occidental companies that work in that area*". In Aptoide's case, although these new complementors can be linked to a local ecosystem, their effects on the platform spread beyond borders. In Paulo's opinion, "*the platform wouldn't be able to deliver the same value to its users. I think the establishment of partnerships and contracts with these local actors are crucial for the platform*". Although these new complementors were not essential for the platform to operate or earn an advantage over its competitors in China, they were crucial to operate in Southeast Asian countries. Without the inclusion of Chinese game developers in Aptoide's ecosystem, the users in this region of the globe would not perceive as much value in the platform as they do. The fact that *GAFA* have restrictions on doing business with Chinese tech companies gives Aptoide the advantage of having a certain exclusivity regarding the distribution of these games in Southeast Asia. These games are culturally more appealing to users from this area than games developed in other parts of the globe. Together with the assured distribution of Aptoide through Chinese OEM's mobile phones, these developers help the platform to perform better in this new market.

Answering the third RQ, complementors are essential for the platform's performance in the new market. For the platforms, including local complementors in their ecosystem can be a way of overcoming cultural and geographical constraints when establishing in a new country. Including local complementors and the preference for local partnerships instead of international ones can make the platform fitter to the new users it wants to engage with, increasing their perception of value. In Zomato's case, when it decided to diversify the services it offers, the platform did not have any international partnerships for those services. The strategy employed by the platform was to customize those services to the Portuguese users instead of seeking international partnerships to help the platform massify more. This preference for local complementors aims to increase the platform's proximity to the local users, making it fitter for their cultural preferences. For Aptoide,

the effects that the inclusion of local complementors generates will influence the platform's value perception internationally. The fact that the platform established a local ecosystem in China, a country where it has no operations, is a sign that the platform's main goal is to earn certain features that will make the platform more attractive around the globe, especially in Southeast Asia, since the effects the platform generates are transferrable internationally.

7 Case Discussion

This study has the purpose of understanding the role of complementors in digital platforms' FSA, as well as to their internationalization process. The cases studied highlight the differences between platforms on the surface level. Nevertheless, although they may differ at the surface, we can find common features that may apply to other platforms. Considering the results obtained in the previous chapter, we will confront them with the second chapter's literature review to understand them better.

Aptoide and Zomato perceive themselves as bilateral markets, which Stallkamp and Schotter (2018) refer to as a consumer-producer dyad. Their primary purpose is to act like the conducting wire between the different actors (Gawer, 2014) involved in both platforms: in Zomato's case, between users and restaurants; in Aptoide's case, between users and developers. Both platforms' main goal is to make the interactions between these actors easier (Evans & Schmalensee, 2014). The network effects (Katz & Shapiro, 1985) that result from the interaction between both actors are noticed by both platforms: Aptoide has the perception that the more users and developers the platform has on both sides of the dyad, the more value the platform has; in Zomato's case, the number of users the platform has on board influences directly the value the platform can deliver to those users. Both platforms evidence what Katz and Shapiro (1985) refer to as direct and indirect network effects. The platforms, however, contrast in the geographical scope of those effects (Stallkamp & Schotter, 2018). Aptoide's network effects are *cross-country*, while Zomato's are *within-country*. Sun & Tse (2009) argue that these network effects make users a critical resource for this type of market, contrary to what happens in other markets. Zomato's case can be used as an example of this argument, given that it is the platform's perception that the users are the main content generator for the platform, without which the platform would not be able to deliver the same value it does.

For Stallkamp and Shotter (2018), these users' networks are a platform's FSA. Zomato shares the same vision since the content that the users insert into the platform helps it differentiate from its rivals and allows its survival, growth, and profit (Grøgaard & Verbeke, 2012). In Zomato's case, one can argue that users are also complementors. Picking up from Stallkamp and Schotter (2018), a complementor can be described as an actor that provides complementary services and products to the platform. In 2014, when Zomato started its operations in Portugal, the platform was dedicated to restaurant listing. Back then, the users served as the central gatekeeper for the information given by the platform about a certain restaurant. Without users providing this service to the platform, it would not be able to deliver the value it intends to. When Zomato integrated delivery and payments services, it had to bring new complementors on board. Payment services company SIBS and delivery services CTT were brought on board, exemplifying what Ojala et al. (2018) differentiate as more or less sophisticated complementors. In Aptoide's case, the main purpose for bringing on board Chinese OEM and game developers was precisely to maintain what the platform perceives as being its FSA (Grøgaard & Verbeke, 2012). The fact that these complementors joined the ecosystem nurtured the feeling of independence that this platform delivers, unlike its rival platforms detained by *GAFA*. Although both platforms highlight their own teams' role in their functioning, Aptoide and Zomato perceive their complementors as crucial to the value the platform intends to deliver to their users. This is consistent with the argument that when we are talking about platforms, the term FSA may not be justifiable since the origin of the platform's innovation can come from the platform's complementors and not from the platform leader itself (Parker et al., 2017; Li et al., 2019). Aptoide and Zomato's cases are examples of what Li et al. (2019) describe as ESA, the idea that the collaboration between the actors involved in the ecosystem will lead the platform to develop better innovations (Hilbolling et al., 2019).

For Zomato to expand its operations to Portugal, creating a new local ecosystem was necessary since there were no global partnerships that the platform could enjoy. This is consistent with Brouthers et al. (2016), that refer that developing a local ecosystem is fundamental to replicating the business model internationally since it is not common for the platform to transfer all its local actors. The same did not happen with Aptoide since the platform is purely digital (Simões, 2019). The fact that the product of the transaction between users and developers is not physical means there's no need for proximity

between users and complementors (Almeida, 2020). Aptoide can successfully exploit its competitive advantages by drawing its digital capabilities and knowledge drawn from external contexts (Rong et al., 2022). We can say, however, that for both platforms non-digital resources have played an essential role in their internationalization process (Stallkamp et al., 2022). If we think of Aptoide, to which this conclusion may seem the oddest, the fact that OEMs have incorporated the platform in their mobile phones was a crucial driver for the platform's entrance into Southeast Asia. For Zomato, the inclusion of CTT and SIBS in their ecosystem, as well as the construction of an extensive user base, have been crucial for the platform's internationalization. This is in line with Ojala et al. (2018), which refer that the participation of these local actors in the ecosystem is vital for successful internationalization, allowing the platform to align its interests with those of its partners.

Johanson and Vahlne (1977) suggest that companies tend to internationalize first to countries with less psychic distance, gradually moving to less similar countries. This was the case of Zomato, which was established in countries like Sri Lanka, UAE, and the Philippines before coming to Portugal in 2014. The Indian food culture is very different from the Portuguese one. When establishing in Portugal, the Portuguese team did not have a manual on how to engage with local actors, given the difference between both countries. This made Zomato face LoF (Johanson & Vahlne, 1977) and LoO (Johanson & Vahlne, 2009), as well as what Rong et al. (2022) refer to as *Liability of Ecosystem Integration*, referent to the challenges that a foreign firm encounters when developing a necessary local ecosystem. Zomato, by preferring local complementors, has customized its platform to Portuguese users' preferences in an attempt to overcome the CAGE drivers (Shaheer & Li, 2020). Aptoide, in turn, benefitted from a political decision (Simões, 2019) to adapt the platform's contents to the Southeast Asian market. The fact that the *GAFA* cannot do business with Chinese tech companies helped Aptoide reach these complementors, helping it be fitter for these specific users' preferences. By making the platform fitter for their new users' culture, Aptoide and Zomato made it easier for users to adopt the platforms, ensuring the internationalization process (Simões, 2019; Shaheer & Li, 2020).

8 Conclusion

This chapter delivers a conclusion to the study. It starts with its key findings, followed by its theoretical and managerial implications, and, last, presents its limitations and future research recommended.

8.1 Key findings

This dissertation addresses the role of complementors in platforms' FSA, as well as in their internationalization process. In order to achieve it, this work draws from a literature review on platforms, on their ecosystems, and on their internationalization process to formulate the following research questions: how do platforms perceive the influence of complementors in their FSA; how does the inclusion of complementors affect the internationalization process; how do local complementors help the platform's successful implementation in the new market? To reply to these questions, a case study was developed on Aptoide and Zomato. This study compares the experience of both platforms to understand the differences and similarities of their actions, behaviour, and rationales.

The analysis of the cases has allowed identifying both similarities and differences when it comes to the international management strategy of the two contrasting platforms. Complementors have an important contribution to the platform's FSA. When building their local ecosystems, platforms invest in choosing the right complementors that can give them an advantage over their rivals in that market. Both cases studied evidence that complementors are vital for the platforms, even though with some differences: for Zomato, including local complementors is crucial for the platform's functioning in the new country; for Aptoide, bringing local complementors on board gives the platform features it can use to increase the perception of the value of their global user base.

Complementors help platforms in their internationalization process. For platforms that rely on the proximity between the actors, the transfer of complementors from one country to the other isn't usually possible. Bringing local complementors on board to fill those bottlenecks helps the platform replicate the business model from other geographies. Non-digital resources can assume an important role in the dissemination of the platform in the intended area, even for a purely digital platform like Aptoide. Including local complementors helps the platform to attenuate the *CAGE* drivers, making it overcome

LoF. By making the platform fit to the new users' culture, complementors help the platform deliver the intended value to them and, therefore, help the platform to establish itself in new countries or regions.

8.2 Theoretical implications

Platform internationalization is a complex process. The establishment of local ecosystems is vital for this process to be successful, with the inclusion of new complementors. Complementors help the platform to differentiate itself from its rivals and to deliver the value users perceive, allowing the platform's success. Bringing complementors on board is crucial for the internationalization of platforms with *location-bound* FSA. In contrast, for platforms with *non-location-bound* FSA, they can be seen as having a positive influence on it. In terms of establishing in a new country or region, complementors are vital to adapt the platform to the new users' culture, helping it be perceived as valuable by them. Complementors are extremely important for platforms to overcome LoF by attenuating cultural and geographical factors that could impede the platform's success in the new geography.

8.3 Managerial implications

Complementors must be perceived by managers as necessary for the platform's value creation and internationalization. Including complementors is vital for platforms to grow, evolve, and adapt. Different complementors may contribute differently to the value creation process, so the platform's strategy must ensure that the right complementor is found to fill a specific bottleneck. This is particularly true for cases where these complementors are not transferrable internationally. These complementors may serve as a vehicle for the platform's adoption in the country or region it wants to establish by increasing accessibility and dissipating cultural factors that may impede users from engaging with the platform. They can also serve as an advantage against rivals due to political decisions constraining their activities. Finally, complementors enhance and nurture the users' engagement with the platform, which is a critical advantage factor that a platform has over its rivals.

8.4 Limitations and future research

As is natural, this study has some limitations. Due to time and access constraints, proceeding with the original plan of studying Aptoide, Zomato, and OLX was impossible. The same constraints impeded reaching the complementors and users of the studied platforms, which would provide additional information from another point of view. Regarding the platforms studied, the fact that Zomato's interviewee integrates the Portuguese office of the platform may mean that he is not aware of the decisions that are made at the firm's highest level, especially regarding international strategy. This factor may be dissipated by the decision to limit the case to the platform's entrance in Portugal. In Aptoide's case, this is not verifiable since the platform is Portuguese and the interviewee is at the center of the decision-making process.

Future research could further expand on the role complementors play in platform internationalization, focusing more specifically on each platform's type. Understanding, for example, how complementors help purely digital platforms to reach new markets. Alternatively, the influence of complementors in helping platforms with a connected physical component engage with their users and in their establishment process in a new country. Finally, given the importance of such a theme, how do complementors contribute to the FSA of a platform driven by social and environmental issues.

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Appendices

A1: Interview guidelines

This following questionnaire was adapted from Hashimoto (2011), Martins (2016), Miranda (2018) and Almeida (2020). All questions were asked on a case-by-case basis, considering the background research conducted prior to interview.

1. **Background Information**
    - **a.** Was internationalization always a plan for your company?
        - **i.** If not, why did you make that decision?
        - **ii.** What were the main difficulties you found?
        - **iii.** Which feature of yours made the difference for establishing (t)here?
    - **b.** How did your internationalization process develop?
    - **c.** In how many countries is your platform present?
2. **On establishing and developing an ecosystem**
    - **a.** Can you provide examples of actors that participate in your local ecosystems?
    - **b.** How was the process of developing your local ecosystems?
    - **c.** Was your international reputation important to kick start your ecosystem?
3. **On FSA and ESA**
    - **a.** Which features differentiate your platform over your competition, giving you advantage over them?
    - **b.** Does your platform have these specific advantages in all the countries it operates?
        - **i.** If not, can you please provide me some examples?
        - **ii.** If so, do your local complementors have a role on this?
    - **c.** Are those features given by your ecosystem?
        - **i.** If so, in which way?
        - **ii.** If not, how is the platform able to generate those features alone?
    - **d.** Which bottlenecks did you find when you established in the new country?

   i. Were them of technical issues or lack of suitable complementors, for example?
   ii. What was your strategy to overcome them?
- **e.** How do you coordinate your local ecosystem?
   i. Are your complementors focused on more than one ecosystem?
   ii. Is it easy to assure coopetition between complementors?

4. On the internationalization process

- **a.** Why didn't the platform transfer its complementors to the new local ecosystem?
   i. Was it essential for the operation in the new country?
   ii. Was it to take advantage of new features only these complementors could give the platform?
   iii. Was it because of your complementors' international scope?
   iv. Was it because of the platform's needs in the new market?
   v. Is there any other reason this happened?
- **b.** Did you feel that the internationalization process could be compromised because of having to include new local complementors?
- **c.** Would you have preferred to have transferred all the complementors from other local ecosystems?
- **d.** Did the inclusion of these new complementors allow the platform to earn advantage over its competitors in the new market?
- **e.** Was the inclusion of these new complementors crucial for the platform to operate in the new market?
- **f.** Would the platform be able to deliver the same value if it did not have these new complementors?

A2: Case study protocol

Table 3: Case study protocol

Task	Actions to take	Performed activities
Case selection	Units of analysis' selection criteria	Digital platforms Digital platforms with an established ecosystem in Portugal Digital platforms with an established ecosystem in, at least, another country Digital platforms that couldn't transfer all its' complementors from one ecosystem to the other
	Contact with the units of analysis	Contact for cooperation via email Discussion about the dissertation's objectives and necessary information Platforms' approval for using their names in the case study Scheduling interviews with the platforms that accepted the request Asking for further information that would be relevant for the case study and its' research questions
Information sources	Information gathering	Search for archival and documental data in newspaper and online articles, company communications, and recorded talks and presentations Search in the websites of the selected platforms for public documentation Development of a questionnaire with questions to assure the creation of the case studies and the triangulation with the data gathered in public documents Access to internal documents and reports on the units of analysis requested after the interviews
Case study construction	Timeframe	Desk research started in March 2022 Interviews took place in September 2022
	Data preparation	Building the first case study with primary and secondary sources of information Contact the first interviewed platform to clarify certain doubts Building the second case study with primary and secondary sources of information Contact the second interviewed platform to clarify certain doubts
	Data analysis	Look for common patterns between the two cases Analysis of common patterns from literature Analysis of differences between the two cases
	Case study discussion	Case discussion was built on the data that was gathered in the interviews and it was built upon the literature review
Others	Provide feedback	Complete review of the case studies by the supervisor Review of each case study by the correspondent interviewee

Source: developed by the author, adapted from Yin (2003), Martins (2016) and Miranda (2018).

A3: Case description

Table 4 - Case description: information on the interviewees

Interviewee	Aptoide	Zomato Portugal
Name	Paulo Trezentos	Nuno Fernandes
Functions	CEO	General Manager & Head of Growth
Interview duration	25 minutes	40 minutes
Nationality	Portuguese	Portuguese

Source: developed by the author, adapted from Martins (2016) and Almeida (2020)

Table 5 - Case description: information on the companies

Company	Aptoide	Zomato Portugal
Main industry	App store	Restaurant listing
Inception year	2011	2008
Country of origin	Portugal	India
Number of markets	Global	24
Company size	<200	30

Source: developed by the author, adapted from Martins (2016) and Almeida (2020)

A4: Contrasting the cases

Table 6 - Contrasting the cases

	Aptoide	Zomato Portugal
Country of origin	Portugal	India
Foundation	2011	2008
Mission statement	To reinvent the distribution and discovery process of mobile devices apps and content in an open and collaborative way	Better food for more people
Company size	>200	30
Number of markets	Global	24
Industries	App store	Restaurant listing
Born Global	Yes	No
Purely digital	Yes	No
Dependency on local ecosystems for local operations	No	Yes

Source: developed by the author, adapted from Almeida (2020)

A5: Data sources

The references presented below were used in the process of data collection about the cases studied.

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