

Competitive Dynamics in the ICT Sector: Strategic Decisions in Platform Ecosystems

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Abstract: In recent years, an increasing number of telecommunications companies such as BlackBerry Ltd. and software companies such as Apple Inc. or Google Inc. strived for a leading platform status within the information and communication technology (ICT) sector. While platform theory is able to cover platforms as isolated entities, it reaches its limits when covering the recent platformization of these modularized markets. Thus, this paper explores how the new platformized market structure has influenced companies' strategic decisions concerning technological developments in the ICT sector. Specifically, it will look at three exploratory case studies: Facebook Inc.'s announcement of its launcher application Home, BlackBerry Ltd.'s introduction of its new operating system QNX, and Apple Inc.'s development of its own navigation application Maps. It concludes that the attractiveness of a platform status within the sector leads to the emergence of complex ecosystems based on the economic logic of cross-sided network effects in which platform companies can follow a unique and new set of strategies.

Key words: platform, two-sided market, ICT, strategy, operability, exclusivity.

Android, Amazon, eBay, Facebook, iOS, Youtube.com, and many more platforms have become an integral part of our worldwide economy. Companies such as Apple Inc. own a whole system of platforms covering a range of areas such as music, broadcasting, telecommunications, and publishing. In the information and communication technology (ICT) sector, platforms are the dominant business model and their presence is steadily growing. Due to the tremendous potential of platforms to increase the market power of technology companies and newly emerging over-the-top (OTT) players, former incumbent device manufacturers such as BlackBerry Ltd. or Nokia Corp. have also strived for a platform status.

Thus, inevitably, the vast majority of today's business transactions and rivalries take place between several platform players, meaning that the

market structure of the ICT sector has become "platformized". We argue, however, that the increasing presence of platforms has not only impacted the market structure per se, but also the business logic of economic transactions and therefore the strategies that companies can potentially follow. While the field of "platform theory" mostly covers platforms as isolated entities or is concerned with rather stylized cases of competition between two similar platforms, the question arises, what happens when several rather dissimilar platforms start to interact with each other in a given industry such as the ICT sector? Thus, we examine how the platformized market structure influenced companies' strategic decisions regarding the technological developments in the ICT-sector in three exploratory case studies: Facebook Inc.'s introduction of its launcher application Home, BlackBerry Ltd.'s design of its new operating system (OS) QNX, and Apple Inc.'s development of its navigation system Maps.

The scientific interest in this topic becomes evident when examining the growing literature, which has gained additional prominence with Jean TIROLE's 2014's Nobel Prize in Economic Sciences. The far-reaching social and economic relevance of the paper is further emphasized by the fact that the ICT sector is increasingly contributing to the growth of the global economy today, which stresses the significance of a detailed assessment of the economic set up of the sector (European Commission, 2012). It goes without saying that in a society more and more dominated by platform mediated market structures the implications of this strand of research have direct impact on, and importance for, the day-to-day business of firms.

First, we briefly outline the business logic and main characteristics of platform companies and describe the evolution of the telecommunications sector into a larger, platform-dominated ICT sector in further detail. Subsequently, we will explore the strategic implications of the new market structure in three case studies and derive suggestions for a holistic assessment of platformized industries.

■ Understanding platforms

Platforms and their providers, as alluded to in the introduction, mediate and coordinate between various stakeholders (BALLON, 2009). Indeed, they follow a different economic logic to traditional merchant firms. Traditional firms follow the rational of linear bilateral exchange: a seller is selling a

product to a merchant, who is selling it to a customer. Conversely, platforms follow the logic of a triangular affiliation: seller and customer are affiliating with a platform, which is enabling their interaction (HAGIU, 2007). As pointed out by EVANS & SCHMALENSEE (2007), platforms arise in situations in which externalities exist and in which transaction costs prevent the market sides from solving these externalities directly. A platform serves as a way of solving these externalities in a way that minimizes transaction costs. Contrary to traditional firms, costs and revenues are thereby theoretically on both sides in platform markets (EISENMANN, PARKER, & VAN ALSTYNE, 2006).

Platforms have received significant attention in design, economics, and strategic management literature under the labels: "platform markets", "two-sided networks" or "two-sided markets". Thus the understanding of what constitutes a platform differs considerably depending on the source (see e.g. ARMSTRONG, 2004).

One reason for this is that the concepts of two-sided markets and two-sided platforms are often used interchangeably (HAGIU & WRIGHT, 2011). For reasons of distinctiveness, however, we propose to regard two-sided platforms as intermediaries in a given market and use the concept of two- or multi-sided markets to describe the market situation in which the intermediaries operate.

A second reason is that the term platform is increasingly applied ubiquitously, referring to companies of all kinds such as WhatsApp and Skype or Facebook and Amazon.com, yet, it is important to acknowledge the difference between them (ROCHET & TIROLE, 2003). While WhatsApp and Skype operate only in a one-sided network, both the two-sided platform of Amazon.com, Inc. and the multi-sided platform of Facebook Inc. rely on cross-sided network effects. Cross-sided network effects appear, since the participation on one side of those companies' market is dependent on the participation of the other side of their market (SCHIFF, 2003). This results in a self-reinforcing growth of the platform. By consequence, due to highly increasing returns of scale, platform industries are dominated by one or a few large platforms (often termed the "winner-takes-it-all" dynamic) (EISENMANN, 2008). This tendency is intensified by the fact that entry barriers are high, since a platform has to attain a critical mass of participants on one market side to attract participants on the other side and *vice versa* (the "chicken-and-egg" problem) (JULLIEN, 2004). Also, cross-sided network effects enable two- or multi-sided platforms to follow advantageous pricing strategies. Many two-sided platforms charge prices at one side below

the marginal cost (in some cases even negative) to enhance profit maximization (EVANS & SCHMALENSEE, 2007). Thus, due to their diverging characteristics, we do not consider one-sided networks as platforms.

A third reason is that, sometimes, tangible environments or locations such as bazaars or shopping malls are discussed as platforms (see e.g. EISENMANN, PARKER & VAN ALSTYNE, 2011). In those cases, however, cross-sided network effects can only play out to a very limited extent, since the market is constrained by physical factors in terms of reach, growth, and available space. We will therefore focus on non-limited platforms such as technology and OTT platforms, which are based on a digital infrastructure.

Consequently, we define platforms as the mediating entities that create value by facilitating interactions between agents that operate on different sides of a digital two- or multi-sided market. To sum up, both the economic transactions within platform markets and the structure of platform markets are determined by cross-sided network effects resulting in industry structures with a tendency towards high concentration and high entry barriers.

■ The platformization of the telecommunications sector

The platformization of the telecommunications sector coincided with the evolution of the sector into a much larger ICT sector. After being dominated by public service monopoly providers for decades, the telecommunications markets in Europe and the United States were liberalized in the 1990s, resulting in a more modularized and horizontally structured market (see e.g. ABBOTT & BRADY, 1999; CRANDALL, 2000). Firms with a background in related industries, such as electronics and computing technology started entering the telecommunications market and diversified the market's offerings through new products and services (MELODY, 2011). In the following years, digitization and fast-paced convergence led to a transformation of the telecommunications sector into a much larger ICT sector with growing network infrastructure capacity and network service provision (MELODY, 2013).

Technology companies were clearly dominating this convergence process, since those firms were more dynamic than the heavily regulated incumbent telecom operators. They quickly embedded internet technologies

in their service and product offers in order to create powerful ICT platforms (HENTEN & TADAYONI, 2013). Indeed, as HAGIU (2014) outlines, the new technology players started offering successful services, software, and products via their digital platforms, which used to be provided by the incumbent telecommunications companies who started to build their own digital platforms as well to secure at least a part of their market share. Google Inc. for example introduced its operating system (OS) Android, which competes directly with the incumbents' OSs e.g. Nokia's Symbian OS. Apple Inc.'s iPhone also competes with traditional handheld manufactures such as BlackBerry Ltd. Likewise, newly emerging OTT players such as voice-over-IP and instant messaging network Skype now owned by the software firm Microsoft Corp., and the online social network platform Facebook entered in direct competition with telecommunications operator's basic services i.e. calls and text message services.

As a result, the incumbents' platforms and the new technology players' and newly emerging OTT players' platforms began to interact with each other in a two- or even multi-sided market fashion. The market structure became more complex and platforms began to dominate on multiple stages of the value chain. The economic transactions of the companies started to be subject to cross-sided network effects, which influenced their strategic moves.

■ Implications for strategic decisions

The platformized market structure of the ICT sector opens up new possibilities and creates new strategic incentives for companies. In the following, we explore three companies' strategic moves concerning technological developments in ICT markets, which have been heavily influenced by the platformization of the sector.

Sample

The paper follows the methodology of exploratory case study through the analysis of three cases. An information-oriented purposeful sampling was chosen to identify critical key cases. Two criteria were applied: First, the cases had to represent the three main groups of platform companies in the ICT sector: old incumbent players (BlackBerry Ltd.), newly entering

technology players from other sectors (Apple Inc.), and newly emerging pure OTT players (Facebook). Second, the cases were supposed to illustrate the whole range of possible outcomes of the strategic moves of a platform in a platformized market environment i.e. successful strategic moves, strategic interventions with ambivalent results, and strategic moves that failed. Accordingly, the following cases were chosen: The first case describes Facebook Inc.'s announcement of its launcher application Home (unsuccessful strategic move), the second case assesses BlackBerry Ltd.'s introduction of its OS QNX (strategic move with an ambivalent outcome), and the third case explores Apple Inc.'s reasons for the development of its in-house navigation application Maps (successful strategic move).

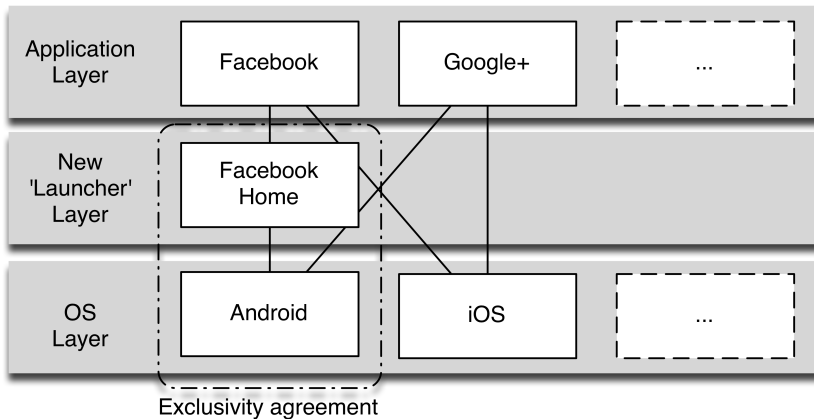
Case 1: Facebook's launcher application Home

A first example of how ICT firms make decisions concerning technological developments in a platformized industry context is the case of Facebook Inc.'s strategy during the introduction of its application Facebook Home. In April 2013, Mark Zuckerberg announced Home, a launcher operating between a phone's OS and application layer, which replaces the usual home screen. The application was first available in Google's application store Google Play on April 12th, 2013 in the United States (OLANOFF, 2013a). Home was jointly developed with AT&T, Qualcomm, Orange, HTC, Samsung, Huawei, Sony, EE, ZTE, Lenovo, and Alcatel (SIEGLER, 2013). It can replace the standard home screen with the social network's own home screen, allowing the customer to chat, see status updates, receive notifications, and watch full-screen-pictures even while using other applications than Facebook (ETHERINGTON, 2013). Although available in Google Inc.'s application store and technically similar, Home can hardly be considered a normal application. Several tech experts considered the application as a "game-changer", since it is transforming the mobile experience profoundly by changing the set up of the home screen (CONSTINE, 2013b).

Interestingly, according to Zuckerberg, the new application will in the near future only be available for the Android OS and not for Apple Inc.'s OS iOS or phones with a Windows OS (OLANOFF, 2013b). Facebook Inc. entered in an exclusivity agreement with Google Inc. before the introduction of its launcher application. Instead of multi-homing with several platforms, Facebook Inc. decided to affiliate exclusively with Android (see Figure 1). Pushing its approach further, Facebook Inc. will concurrently offer a special version of Home on the Android-based HTC first, coming close to what can

be considered a Facebook Phone. In addition to Facebook Inc.'s notifications, it will allow Home to display notifications of third-party developers (SIEGLER, 2013).

Figure 1 - Facebook Inc.'s strategic move



The exclusivity agreement is a win-win situation for both players. Facebook Inc. does not have to build its own device. As Mark Zuckerberg stated:

"Today we're going to finally talk about that Facebook Phone. More accurately, we're going to talk about how you can turn your phone into a Facebook Phone" (CONSTINE, 2013a).

Google Inc., for its part, can enrich its value proposition by offering the customer unique and exclusive access to the application. Furthermore, Google Inc. can enhance Android's ability to create a customized experience as a competitive advantage compared to the closed and static iOS of Apple Inc.'s iPhone. A Google Inc. representative stated, "It's a win for users who want a customized Facebook experience from Google Play – the heart of the Android ecosystem – along with their favorite Google services such as Gmail, Google Search, and Google Maps" (OLANOFF, 2013b). Indeed, the system's openness and the wide range of possibilities for modifications and customizations was also the reason that Facebook Inc. chose Google Inc.'s OS (OLANOFF, 2013a).

An exclusivity agreement would already have been an advantageous strategic move between two traditional merchant companies. The exclusivity of their offer enables the companies to charge higher prices to third parties

and deter market entry to rivals, therefore expanding their profits and market dominance (see also HAGIU & LEE, 2008). However, in this case the agreement marks the alliance between two platform companies, whose economic success is relying on cross-sided network effect and, thus, economies of scale. The exclusive offer of the launcher application attracts new customers to Google Inc.'s Android platform, which further increases the platform's attractiveness for application developers and phone manufacturers. A growing application store and the joining of further phone manufacturers leads to an even further growth of the user base – the typical increasing power feedback loop in two- and multi-sided markets. A growing user base for Android, however, also means further potential participants for Facebook Inc.'s platform, whose growth attracts further advertisers, Facebook application developers, and customers. Through the agreed alliance of both platform companies, Android can then use Facebook's growth to continue to fuel its own growth yet again. Consequently, the exclusivity agreement connects and accelerates the cross-sided network-effect-based growth of both platforms.

The platforms improve their competitive position by increasing their grip on the respective "downstream" or "upstream" layer in the value chain and create a "silo" with tremendous and expanding market power. Contrary to integration, the creation of such a silo through an exclusivity agreement is easily achievable in a platform-dominated market. Yet, one of the player's platforms has to be large enough to offer an upstream or downstream player sufficient incentives to enter such an agreement. If Facebook Inc. could achieve a bigger competitive advantage via cross-sided network effects through multi-homing, a preferential treatment of Google Inc.'s platform would not be attractive for the platform company.

Yet, the success of the Home application and thus, of the platform silo, failed to materialize. There are several possible explanations for the failure of Home. The application had a limited rollout and was finally only available for the six latest devices from Samsung and HTC instead of the whole Android user base (OLSON, 2013). Besides, many users missed popular Android features such as widgets or multimedia options during messaging after the installation of Home (CARLSON, 2013). Also, the dominant branding of the phone through the launcher application might have deterred users from installing the application, since they might not like to regard a leisure activity such as the browsing of Facebook as the primary use of their phone (MAC, 2014). Consequently, the user base of the application was too small, which hampered its cross-sided network effect based growth and the power of the platform silo.

Summing up, Facebook Inc. designed its technology exclusively for the Android OS to exploit the tremendous competitive advantages linked to the economies of scale achievable by connecting two platforms. The exclusivity agreement with Google Inc. enabled Facebook Inc. to create a platform silo within the value chain, linking the potential growth of both players. The failure of the application, however, made the alliance ineffective.

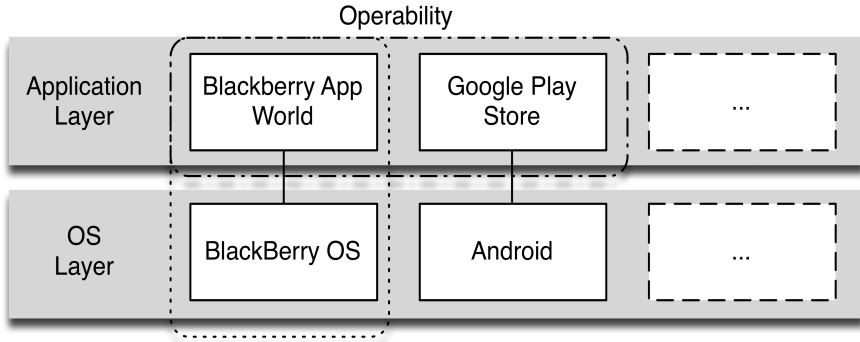
Case II: BlackBerry's operating system QNX

Another case that shows how a platform firm interacts strategically in a platform-dominated industry with high competitive pressure is the case of BlackBerry Ltd.'s technological design of its new OS. In April 2010, BlackBerry Ltd. bought QNX, an Ontario, Canada-based developer of a proprietary microkernel-based UNIX-like OS. In September 2010, BlackBerry Ltd. explained the purpose of the acquisition: QNX would be the core OS of BlackBerry 10 devices such as the BlackBerry PlayBook and all future BlackBerry smartphones (PERLOW, 2011). Then in January 2011, BlackBerry Ltd. announced a "better Android than Android": The companies new QNX OS can run Google's Android applications in addition to Adobe Air, HTML5, and native C/C++ QNX (PERLOW, 2013). However, instead of virtualizing Android (the strategy of Amazon's Kindle Fire) to ensure operability with the Android application store, BlackBerry Ltd. chose a different tack. The company introduced a native port of the Dalvik virtual machine port, which is the software that runs apps on Android devices (PERLOW, 2011). As a result, users of BlackBerry Ltd.'s devices could also access Google Inc.'s application store Google Play.

By bundling its own application offer with the application offer of Google Inc.'s Android platform, BlackBerry Ltd.'s devices became a multiplatform solution with an extended value proposition. By repackaging Android applications through this strategy, BlackBerry Ltd. was able to extend its BlackBerry 10 Application store significantly and reach the 100,000 applications milestone (WOODS, 2013). BlackBerry Ltd. is thereby ensuring operability between its platform and the platform of Google Inc. or, in the words of EISENMANN *et al.* (2011), is carrying out an envelopment attack on its competitor's application store (see Figure 2).

This move ensured BlackBerry Ltd. a significant competitive advantage. The accessibility of both stores enables BlackBerry Ltd. to reach the user base of Android phones as well, thereby potentially extending its user base by reaching far more possible customers.

Figure 2 - BlackBerry Ltd.'s strategic move



Apart from a larger user base, however, as a platform company, BlackBerry Ltd. achieves two other useful benefits. First, an affiliation towards several platforms (multi-homing) is rather unusual in ICT markets due to high switching costs (cost of the device). Thus, customers will most likely choose one platform – the platform with the greater, and thus more attractive, value proposition. Second, the company is increasing the scale of its platform, which is enhancing cross-sided network effects and leads to a potential overall growth of the platform. An increasing amount of customers on the market side will raise the attractiveness of the platform for application developers and *vice versa*.

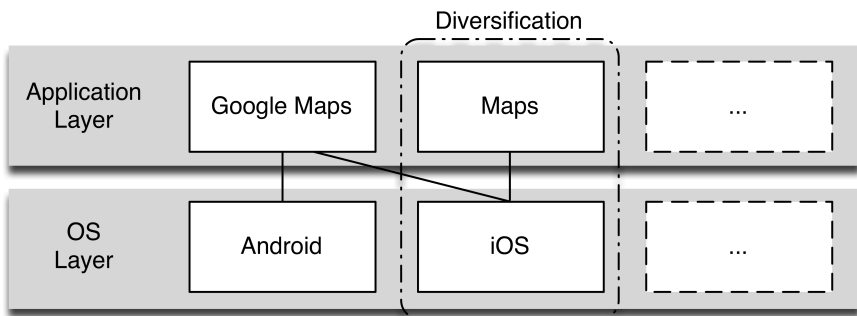
Nevertheless, although its weak application store was often seen as BlackBerry Ltd.'s flaw and its extension was applauded by users, BlackBerry Ltd. was not able to stop its downfall with this strategic move (SHINAL, 2013). Indeed, there is a difference between the ability of running Android applications and a full operability agreement as in the previously discussed case of Facebook Inc. and Google Inc. One reason being that Google Inc.'s application store, Google Play is not available on BlackBerry 10 devices. Only applications which do not rely on Google Play services and which are available from third-party application stores are accessible (RASH, 2014). A second reason being that applications built for the native BlackBerry Ltd. platform are more feature-rich, easier to navigate and less subject to bugs than the available Android Apps (WOODS, 2013). And a third reason being that even by leveraging Android's applications store, BlackBerry was not able to come close to the offer of Apple (900,000 applications) or Android (800,000 applications) at the time of the launch of its OS BlackBerry 10 and popular applications such as Netflix, Instagram, or Spotify were not accessible (GILBERT, 2013). Consequently, BlackBerry Ltd. could not stimulate effectively the cross-sided network effect based growth of the

platform. That said, there is a further risk associated with the strategy of leveraging Android's ecosystem that could lead to a collapse of the new application offer; Google Inc. could decide at any time to change the architecture or code of its Dalvik virtual machine. This would force BlackBerry Ltd. to invest substantially in continuous updates of its OS to ensure operability with the Android application programming interface (API) (WOODS, 2013). Also, BlackBerry Ltd. might foster the growth of Android applications but hamper the development its own native C++ and Adobe Air applications, undermining its own ecosystem in the long run (PERLOW, 2013). To conclude, BlackBerry Ltd. was able to achieve significant advantages through the connection of its QNX platform with Google Inc.'s platform. However, the lack of a common agreement backfired on BlackBerry Ltd. and prevented the platform from building a larger user base.

Case III: Apple's application Maps

A third example of a platform's possible strategic move in platform-dominated ecosystems is Apple Inc.'s development of its navigation application Maps. In the early iOS versions, Google Inc.'s navigation program Google Maps was an integral part of Apple's iPhone. In September 2012, however, Apple Inc. launched its own navigation application Maps, apparently after Google Inc. refused to enable the turn-by-turn voice-guided navigation in its application to iOS users (CROOK, 2012). With the launching of Apple Inc.'s iPhone OS iOS6, Maps became the default navigation service on the iPhone. By introducing its own application, and thus a new integrated platform in the application domain, Apple Inc. was able to decouple its OS platform from Google's platform (see Figure 3).

Figure 3 - Apple Inc.'s strategic move



With this strategic move, the company ensured that Google Inc. could not benefit from its user base any further. Besides, since Apple Inc. operates in a platform-dominated industry context, the platform company gained two further important competitive advantages. First, by discontinuing to give a competitor's application an exposed position on its OS platform, Apple Inc. could advance the creation of its own closed platform ecosystem. Apple Inc.'s closely integrated value chain of platforms i.e. device (iPhone), OS (iOS), and application store (AppStore) usually permits any kind of operability thus fueling itself through the power achievable by building a platform silo (see Case I). Second, the establishment of its own default navigation program enabled Apple Inc. to disconnect its cross-network effect based growth in market power from the growth of Google Inc.'s platform. Apple 'commoditized' the layer, in the sense that the platform company is no longer economically reliant on Google Inc.

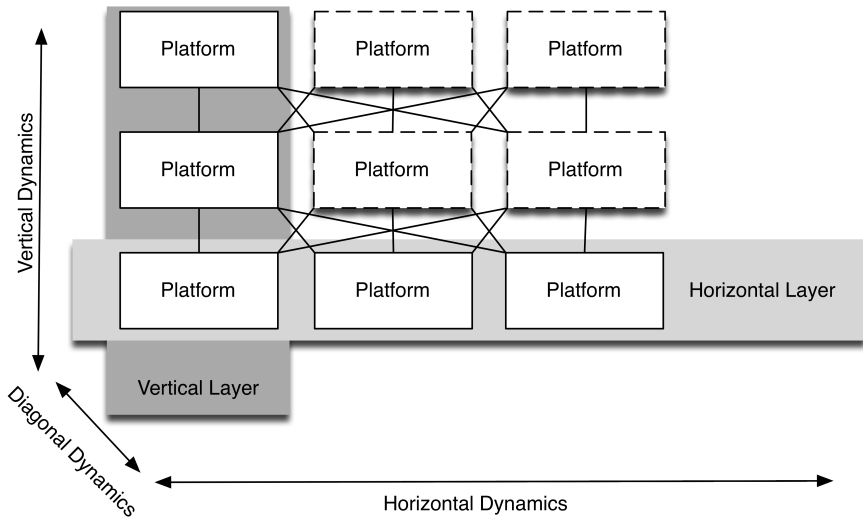
However, there is a popular perception of a failure surrounding Apple Inc.'s Maps application. Several software errors, such as the wrong naming of locations, led for the first time to a drop in customer satisfaction of iPhone users switching to iOS 6 (LUNDEN, 2014). Besides, Apple Inc.'s navigation app lacked a transit option and users had to refer to third party apps for this function – including Google Maps. When Google Inc. made its navigation application Google Maps available for iOS in December 2012, it quickly became the most popular downloaded application in the AppStore (GABBATT, 2012). Contrary to common belief, however, Apple Inc.'s strategy was highly successful. According to ComScore (2013), Google Inc. lost a large share of its Maps' user base after the introduction of iOS 6 – which is of higher value to Google Inc. than to Apple Inc., since Google Inc. needs Map's data for its core business, i.e. search and advertising, to be able to provide location-related advertising, while Apple Inc. mainly used the data to improve its phone signals and traffic forecast services (ARTHUR, 2013).

To conclude, Apple Inc. turned their misfortune into a fortune by developing its own navigation application, which enabled the platform company to gain a significant competitive advantage and to weaken its main competitor Google Inc.

■ Discussion

The three case studies presented above explored the strategic moves of different platform players in the ICT sector as well as their outcomes. In the following section the results of the study and its possible practical and conceptual implications are discussed in further depth.

Figure 4 - Model of a platform-dominated ecosystem



In all three cases, several platforms operate not only next to each other in the same market but also on top of each other in the value chain creating a complex ecosystem consisting of several layers of platforms. In each of the cases, the platform companies interacted with another platform company in an adjacent layer. Figure 4 displays a conceptual image of such a layered industry ecosystem consisting of two- and multi-sided platforms. The horizontal competition between companies in the same market, the vertical competition within the value chain, and diagonal competition from outside the ecosystem from companies in adjacent markets are based on further parameters in such a platformized ecosystem.

The case studies showed how this 'layered platformization and the diverging nature of the competitive dynamics in such ecosystems affected not only the industry structure of the ICT sector, but also the economic transactions within the ecosystem and the companies' strategic decisions concerning technological design and expansion.

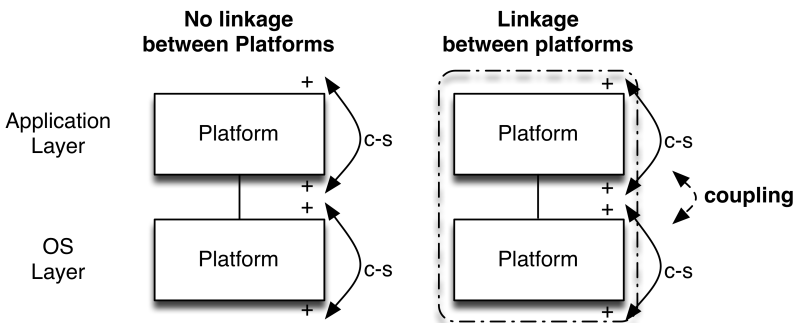
Facebook Inc. linked its platform to Google Inc.'s Android platform via an exclusivity agreement. However, the attempt failed, due to an inferior product design and branding, and most importantly due to a minimal market size for the final exclusive product. BlackBerry Ltd. embarked to connect its application store to Google Inc.'s store via a non-mutual operability agreement (envelopment attack). The result of the strategic move was ambivalent. BlackBerry Ltd. was able to enlarge its application store, however, while decreasing its quality. Apple Inc. finally separated its OS platform iOS from Google Inc.'s platform via diversification. This strategy proved to be successful, since Google Inc.'s Google Maps lost a significant market share (see Table 1).

Table 1 – The three case studies

	<i>Strategy</i>	<i>Target</i>	<i>Result</i>	<i>Reason</i>
Case I	Exclusivity agreement	Complementor	Fail	Size of user base
Case II	Operability/ Envelopment	Direct competitor	Ambivalent	No mutual partnership
Case III	Diversification	Complementor/Indirect competitor	Success	-

The key to the success of platform companies lies in their ability to create a market with rising economies of scale and high entry barriers via the exploitation of cross-sided network effects (ROCHET & TIROLE, 2003; 2006). Thus, the aim of all strategic moves described in the case studies was to improve the platform companies' competitive position by coupling (or de-coupling) cross-sided network effects, which are the source of a platform company's powerful growth. This was achieved in each of the cases by the creation (or destruction) of platform silos (see Figure 5).

Figure 5 - Coupling of cross-sided network effect related growth (cs)



Yet, some of the assessed companies failed to take some factors related to their platform's market position, market power, and available assets into account when linking their platform strategically:

- *Position.* Linking two platforms increases economies of scale and results in a coupling and enhancement of both companies' cross-sided network effects i.e. long-term growth. In a platformized layered ecosystem the market position of the two platforms is crucial. In general, the connection of two complementary platforms can be highly beneficial for both partners. Facebook Inc., for example, chose to link itself to the complementary Android platform in order to foster its growth. Sometimes, however, disconnecting from a platform can be equally beneficial. Apple Inc. separated itself from Google Inc.'s Maps platform and forewent the benefits of a platform silo even though Maps was a complementary product to Apple Inc.'s platform because upholding the linkage of both platforms would have meant indirectly fostering its rival's growth.

- *Power.* The stability of the linkage between two platforms depends on their prevailing market power. Although the linkage between Apple Inc.'s and Google Inc.'s platform was not especially beneficial for Apple Inc., the silo could exist for several years since both companies initially accepted the liaison. They were neither direct competitors, nor was their market power significantly different. On the contrary, BlackBerry Ltd. underwent a considerably higher risk when it forced a connection upon a more powerful and direct competitor. As a result, the company could not gain full control over its new product bundle and the maintenance of the connection might prove to be resource-intensive, thereby decreasing the effectiveness of BlackBerry Ltd.'s strategy.

- *Assets.* Facebook Inc. chose a potentially highly beneficial strategy when connecting itself with a complementary platform. However, not only did the product fail (as in the case of BlackBerry Ltd.'s expanded application store), but also the conception of its user base. Cross-sided network effects are based on economies of scale. Thus, a too narrow market definition, as in the case of Facebook Home, which was limited only to a very specific user group i.e. a handful of devices owners, confines the potential of cross-sided network effect-based growth significantly.

The representativeness of the cases is naturally constrained since only three key cases were chosen. Nevertheless, the insights from the studies enabled us to gain insights into the conception of platformized industry ecosystems and can be used to conduct further, more directed research with a larger sample.

■ Conclusion

Platform companies increasingly dominate the market structure of the ICT sector. We conducted three case studies to illustrate the strategic possibilities that can result from such a platformized market structure.

The first case analyzed the strategic alliance of Facebook Inc.'s launcher application Home with Google Inc.'s Android platform through an exclusivity agreement. The second case illustrated BlackBerry Ltd.'s strategy to increase the power of its platform by enabling operability of its OS QNX with Google Inc.'s application offer. The third case assessed Apple Inc.'s development of its own default navigation application Maps, which allowed Apple Inc. to harm its competitor Google Inc. by excluding the company from its powerful platform silo. Although not always successful, the strategic moves described in the three cases illustrate the strategic potential of platform companies in platformized market contexts. The cases imply that in order to create a sustainable and beneficial platform silo, both partners have to keep track of their assets, relative market power, and position within the platformized industry ecosystem.

The diverging economic logic of platformized ecosystems shape the competitive dynamics in those ecosystems and thus the strategies of companies operating within them. The platforms in these platformized ecosystems create crucial common assets, but also powerful bottlenecks in the digital market environments that were once destined for modularity and openness. Cross-sided network effects and rising economies of scale can be exploited in such markets to achieve tremendous market power. In the long term, an increasingly platform-dominated market structure can lead to highly unequal power distributions. Platforms have to balance their potential for powerful cross-sided network effect related growth, with the necessity of a sustainable ecosystem via co-opetition (see also BRANDENBURGER & NALEBUFF, 1997). Accordingly, platform companies such as Apple Inc., Facebook Inc., and BlackBerry Ltd. will have to choose a competitive strategy in accordance with their platformized market environment to achieve and maintain a dominant market position in the future.

It will be up to more research to further describe the competitive dynamics in industry ecosystems that consist of two-sided and multi-sided platforms and to explore the influence of those dynamics on the strategic choices of platform companies. It will be equally important to name further potential strategies that platform companies are able to exploit. In this

context, it might also be interesting for researchers to formalize and quantify the coupling of cross-sided network effects.

For practitioners, a thorough assessment of the dynamics and strategies in platformized ecosystems could prove to be useful in order to achieve a deeper understanding of the new platform-influenced dynamics in digital markets. A systematic mapping of market positions, strategies, and competitive dynamics could possibly enable them to identify their own firm's market position and realize opportunities, threats, and solutions within this new market environment.

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