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Working Paper 21-086

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Funding for this research was provided in part by Harvard Business School. The author has performed consulting work on behalf of Facebook and most other high tech platforms, as well as the U.S. Department of Justice and the European Competition Authority. Keystone Strategy helped perform some of the analysis in the paper.

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A. Overview

Network effects have risen to the forefront of platform competition discussions (e.g. the House Judiciary investigation of competition in digital markets, claiming that Facebook, for example, is entrenched due to strong network effects and high switching costs).[1] While newer literature has developed much more sophistication in characterizing network effects, common regulatory perspective often assumes more simplistic views.

Older literature tend to simplify the issue of network effects and focus on size as a primary determinant of their strength and impact on competition. The historical characterization of network effects as constituting "winner-take-all" systems is inaccurate. More recent work shows more nuance and considers factors such as network structure and ease of multi-homing which may significantly reduce the strength of network effects. Ultimately, network effects do not necessarily increase in line with network size. For example, network structural traits may weaken overall network effects depending on the degree of clustering on the network. This leaves highly clustered platforms particularly susceptible to competition. Such traits may be specific to a given industry, platform, or even platform feature.

The Facebook network, for example, like many other social networks is characterized by a large number of relatively small and largely separate local clusters. This indicates that network effects may be weaker for Facebook than the sheer size of their user-base may imply. The more tightly clustered a network is, and the more segregated these clusters are, the easier it is for competitors to enter the market with focused solutions. This significantly reduces the likelihood of an individual social network gaining dominant share and adds pressure on incumbents to innovate and compete to retain users.

Moreover, competition in social media is evidenced by the prevalence of multi-homing amongst social network users, the frequency of entry and success of competitors, and the necessity for innovation by incumbents. Multi-homing reduces user reliance on any platform, exposes users to competitors, and suggests broadly that other competitive options exist. Such multi-homing forces constant innovation by incumbents, despite the inevitable costs of such innovation. Ultimately, the entry and success of new competitors such as TikTok and Snapchat serves as compelling evidence of significant competition.

B. Introduction

Platforms provide the infrastructure to connect different networks of users and complementors to each other (Eisenmann, Parker, and Van Alstyne 2006, and Srnicek, 2017). The markets these platforms connect to are often characterized by "network effects," meaning that the value of a platform to users is affected by the number of other participants (Rohlfs, 1974). Telephones have little value to a user if no one else participates in the same network. However, as other users join the network, the number of possible connections between telephone users increases in a power law fashion (Albert, Jeong, and Barabasi 1999, Barabasi and Albert 1999, Meyerovich and Rabkin 2013, Madureira, 2011). Thus, the value of a telephone network increases with the number of users participating in that network.

Modern platforms often have multiple "sides," connecting different networks to each other and engaging in a variety of transactions. For example, the ridesharing service offered by Uber connects networks of riders and drivers. Drivers value having riders to serve, and riders value having access to many drivers. Such cross-platform network effects are considered to be indirect. This contrasts with the same-side network effects between telephone users, which are considered to be direct. This paper will focus on the direct network

[1] https://judiciary.house.gov/uploadedfiles/competition_in_digital_markets.pdf

effects occurring on user-side. Indirect network effects, as those which may exist between users and advertisers, will not be discussed.

Platforms differ in features, user base, structure, and more. The characteristics of the networks a platform connects to are critical to understanding the value of platforms, the network effects they experience, and the competitive landscapes they operate in. For example, peculiarities in network structure such as clustering can have powerful implications on network strength and the defensibility of platforms. Additionally, user engagement tendencies such as multi-homing may weaken user reliance on a given platform, intensify competition, and force innovation by even large incumbents. These effects are particularly pronounced amongst social networks and tend to reduce the effective strength of network effects, enabling entry and competition.

Ultimately, network effects may be influenced by a wide variety of factors, and size alone is often a poor indicator of the strength of network effects. Furthermore, network effects alone do not typically create insurmountable barriers to entry, and competitive impacts must be assessed in context, especially to account for differences in industry and user behavior. For example, due to structural features such as the tight clustering characteristic of Facebook's network and the prevalent multi-homing of, Facebook may actually experience relatively weak network effects, which would explain the significant competition it faces for user engagement. These ideas are evidenced by the regular entry and success of rivals, a strong user tendency to engage with competitors, and the necessity for constant innovation and investment.

C. Literature review

1) Historical concerns regarding network effects

In the early days of network effects discussions, many economists feared that network size would determine the outcome of a "winner-take-all" system in any market characterized by network effects (Besen and Farrell, 1994, Sheremata, 1997, Church and Gandal, 1993, Wade 1995). Of particular concern was the perceived possibility that network effects might result in the market settling on inferior hardware or software standards, merely because they retained an initial advantage, especially in installed base. This extends from the idea that such markets might have path dependency in settling market equilibria, resulting in the potential for market failure (Katz and Shapiro, 1985, Farrell and Saloner, 1985, Arthur, 1989).

However, claims regarding remediable failure as a consequence of network effects often rely on strict assumptions, are hotly contested, and verifiable occurrences are empirically rare (Liebowitz and Margolis, 1990, Williamson, 1993).[2] While early works provide a useful framework for general theoretical use, many are restricted by strong assumptions or generalizations, and largely focus on network size as the primary determinant of network value.

For example, several economists famously decried the rise of the QWERTY keyboard as an inferior standard. Many argued that the keyboard's success was merely a consequence of the positive feedback triggered by its initial introduction and large network size, despite an inferiority to alternatives, such as the Dvorak keyboard (David 1985, Krugman, 1994, Katz and Shapiro, 1985). This claim would later be contested due to allegations of bias, methodological flaws, and contradiction with results from later studies (Williamson, 1990, Liebowitz and Margolis, 1990).

Similarly, many alleged that the success of the VHS VCR over the Betamax VCR could be attributed to network effects (Cusumano, Mylonadis, and Rosenbloom 1992). However, it is important to note that VHS won the standard battle against Betamax despite Betamax's incumbency. This runs counter to the idea that path dependency should favor the first product to emerge. Instead, VHS's success could be attributed to a

[2] Remediable failures occur when it is possible for the correct choice to have been recognized and the outcome fixed.

consumer preference for its distinct features (Liebowitz and Margolis, 1994). Thus, although it is true that the VHS standard came to dominate VCRs, this outcome should not be thought of as a predetermined market failure.

2) Later nuance in characterizing network effects

More recent literature suggests that, for many platforms, total network size is only one factor in determining the strength of network effects, and, further, that network effects are only one dimension of platform value (McIntyre and Srinivasan, 2017, Koh and Fichman, 2014, Afuah, 2012, Hagiu and Rothman, 2016, Lianos and Kokkoris 2010). In fact, a wide variety of factors determine the strength of these effects and their implications on equilibria, including industry-specific traits, existing network structure, and investment into new technologies, among many things.

Multi-homing serves as an indicator of competition (Rochet and Tirole, 2003, Caillaud and Jullien, 2003, Halaburda and Yehezkel, 2013, Cao et al., 2018). Multi-homing can have a negative effect on overall network effects, because it weakens user reliance on any given platform by allowing users to split their attention between several platforms (Jullien and Zantman 2019). The prevalence of multi-homing may indicate that competitors of comparable value exist, and that users have an awareness of those competitive options, making innovation especially important. Factors such as low homing and switching costs, as those seen in social media, allow users to multi-home with relative ease (Farrell and Klemperer 2007, Eisenmann, Parker, and Van Alstyne 2011).

Understanding network structure, and specifically the clustering which appears in relevant networks is key to understanding the relationship between platforms and competition (Abrahamson and Rosenkopf, 1997, Porter, 2000, Bell, 2005, Lee, Lee and Lee 2006, Afuah, 2012). For example, networks with "small worlds" properties are highly clustered, meaning that users tend to care about and connect with smaller groups. Users from these niche groups may be connected by several distinct features, such as interests or geography. Such local clustering means that the value of the network to these users does not necessarily grow as the network increases in size, and that the network effects actually experienced by any given user may be weaker than the those implied by the size of the full network (Aldrich and Kim, 2007, Choi, Kim and Lee, 2010, Zhu and Iansiti, 2019). Competitors may target these niche groups rather than the entire network, making it easier for entrants to compete with incumbents.

Such factors have strong implications with regard to the competition and survival of platforms. For example, consider the case of ride share apps such as Uber and Lyft. These apps introduced innovative ride sharing technology, and quickly took share from existing ride-hailing services like taxis. However, after almost a decade, they still struggle to make a profit. This is because, despite the existence of network effects, prevalent multi-homing and localized clustering have driven competition in ride sharing. Ride share networks are highly fragmented into local clusters, meaning that entrants must only reach critical mass on a local level. Multihoming for both drivers and riders is relatively costless and can even be cost saving when riders compare prices between platforms (Zhu and Iansiti, 2019). [3]

Ultimately, network effects do not typically create market failures or insurmountable barriers to entry. Network effects are complex and are influenced by a variety of factors specific to a given industry, platform, or even type of engagement. Characteristics such as network structure and multi-homing can substantially

[3] There are many other factors which may weaken network effects. Of note is the potential for disintermediation by users. Disintermediation refers to the bypassing of intermediaries in transactions. When users can easily recreate interactions outside of a platform, disintermediation can threaten to diminish a network's size. For example, a platform which charges a fee to connect homeowners with cleaning services might lose homeowners after the initial match. If a homeowner is satisfied with the cleaner and is able to contact them outside of the app, there is little incentive to continue paying the fees for the matching service. The prevalence of this type of behavior tends to decrease total network size and weaken network effects.

influence the strength and implications of network effects. As such, evaluations of the strength of network effects and their impact on competition are best conducted on a case-by-case basis.

D. Review of empirical measurement of network effects

Discussions surrounding network effects tend to be highly narrative driven, and do not necessarily capture the nuance that exists in the real world. This may lead to oversimplification in some early network effects literature regarding platform success and failure (such as the previously discussed QWERTY example). A central step in determining the extent to which network effects might cause market tipping is quantifying their benefits to a specific company's market position. A standard empirical estimate of the strength of network effects, however, has yet to fully emerge from the academic literature. Further, there is limited understanding of how network effect magnitudes may vary across industries and the development cycle of a company.

As discussed, not all networks are created equal and the network effects that companies may derive from building them are highly specific to their structure (e.g. one-sided or multi-sided; uniform or clustered) and offerings, requiring the thoughtful construction of analyses. Additionally, data is often difficult to acquire, especially those which allow the researcher to control for confounding effects.

Given these challenges, the general methodology in the current literature is to use regression analysis and other econometric methods to model a success metric specific to the industry being evaluated. In these analyses, the expected change to the chosen metric dependent on a percentage point growth in the relevant user population may serve as an estimate of the network effect. User acquisition is a highly popular metric, although other measures such as engagement, prevalence of multi-homing, and retention by geography can also be relevant for evaluating network effects. We see this approach used to analyze a variety of industries: from the yellow pages (Rysman, 2003), to bank payments technology (Gowrisankaran and Stavins, 2004), to digital marketplaces (Chu and Manchanda, 2016).

Controlling for confounding factors is central to studies which quantify network effects. Changes in consumer tastes as well as firm investment in the platform are particularly tricky as they are likely to be strongly correlated with our metric of interest. Rysman (2019) outlines some of the econometric difficulty in separating these variables from the network effect and gives a guidepost to understanding the circumstances and assumptions required for dealing with such confounding factors. In simple terms, the data must be such that (i) the population may be to be divided into discrete groups for whom the network effect is only a function of internal group connections, (ii) the network effect is not influenced by group characteristics (or for any differences to be controlled for), and (iii) individuals within each group to have the same innate desire to use the product. This type of data is often proprietary and difficult to obtain, as evidenced by the lack of empirical estimates characteristic of network effects literature.

E. The Facebook network

1) Social networks

On a basic conceptual level, it is easy to understand how a social media platform might benefit from network effects. Social media platforms are primarily used to interact with others, and the addition of users to a platform directly increases the number of possible interactions across the platform just as in telephone networks. Despite this simple intuition, we find a notable lack of robust quantitative estimates for the impact of network effects on key social media metrics.[4] Consequently, the isolated impact of network effects on

[4] While there do exist studies related to dating applications (Voigt and Hinz, 2014, Burtch and Ramaprasad, 2016), it is unclear whether such platforms should be viewed as more akin to marketplaces than traditional social media for analytical purposes.

competition in social media is not well understood, and leaves room for easy overstatement of network effects without much understanding of potential limiting factors.

One factor which tends to limit the strength of network effects on social media platforms is tight network clustering. While users value having their close contacts use compatible social media platforms, they tend to care less about additional users outside of their local network/cluster. Thus, the addition of marginal users outside of an individual's social circle (i.e. cluster) may not directly contribute to user utility or may do so with very limited effect. Such clustered networks may also be more vulnerable to competitor entry if clusters of users are targeted by new entrants in a systematic manner.

The tendency for social media users to multi-home also has strong implications on the strength of network effects and platform defensibility. Multi-homing is incredibly common in social media, and users face little friction in doing so (Schmalensee, 2011, Mital and Sarkar, 2011, Hagiu 2010). This is especially true given social media platforms are typically free. The ease of multihoming allows users to easily get exposure to competing platforms and either divide their use or switch platforms entirely.

Furthermore, network effects need not be positive. In social media, the addition of certain users might even detract from the value of the platform for other users if such an addition generates the potential for undesirable connections (Evans and Schmalensee, 2017). This, in addition to user clustering and ease of multihoming, has allowed competing social media platforms such as Snapchat to penetrate by targeting narrower user groups (e.g. teenagers) who might benefit from the privacy of a more limited network. Over time, these factors, among others, have allowed new social media platforms to regularly enter and co-exist at scale with incumbents.

2) Network clustering

Understanding the nature of connections on a social network is important in assessing network effects and network value. As discussed, when users are added to a network, the number of possible connections between users grows in a power-law fashion. However, viewing networks exclusively in terms of the upper-bound of possible connections is misleading when it comes to understanding the contribution of network effects to a platform's value and strategic defensibility.

For social media platforms like Facebook, an individual's adoption decision, as well as the enjoyment of the interactive features of the platform, is primarily influenced by the participation of a more limited social circle. This is supported by prior literature which finds that certain connections on a network are likely to be far more valuable than others (Odlyzko and Tilly 2005). In particular, social media adoption behavior is strongly influenced by an individual's local network structure (Katona, Zubcsek and Sarvary 2010, Kempe, Kleinberg and Tardos 2003), with specific 'influencers' contributing to adoption behavior more, especially when they share similar demographic traits.[5]

When Facebook's network structure is evaluated directly, there is strong evidence of user tendency to form smaller groups, meaning that the set of users relevant to an individual Facebook user's experience is relatively small. These clusters are groups of friends that have many connections internally but relatively few externally (Mishra 2007). This means that, while any Facebook user can in theory be connected to any other user on Facebook's network, individuals tend to connect in a tight-knit fashion within smaller subgroups. As in other

[5] Anthropological studies have found that there are cognitive limits to the number of individuals people can have consistent social interaction with (approximately 100-200) (Dunbar 1992). Such limits may still apply to our online behavior (Goncalves, Perra, and Vespignani 2011, Dunbar 2016). Additionally, individuals exhibit a preference for interacting with people similar to them, in a phenomenon called homophily (McPherson, Smith-Lovin and Cook 2001), which may explain the forming of such demographic clusters.

social media, Facebook users tend to interact with limited clusters corresponding to the populations that share certain demographic traits with them.

Prior literature has found that Facebook users are far more likely to connect with users who are of a similar age (Ugander 2011), are geographically close (Bailey 2018, Bailey 2020 and Ugander 2011), are of similar race and income (Bailey 2018), or have similar political interests (Arsic 2016). Such preferences limit the expected number of friendship connections for any given user on the network. In fact, there may even be preference for fewer friends. Ugander (2011) demonstrates that the fraction of users with 'x' number of friends uniformly decreases as 'x' increases beyond 20. This same study, however, finds that Facebook clusters exhibit more dense connections within each cluster than earlier messenger applications (approximately 5x more than an earlier study of MSN Messenger), indicating that within-cluster connections may be strong.

This provides a compelling indication that the number of users relevant for an individual's adoption decision is limited relative to the full scale of the Facebook network. Users are far less likely to care about additional users outside of the relevant local set with which they desire to interact. Therefore, the network effects experienced by any given user are limited in strength and do not appear to scale in the simple power-law fashion that is sometimes assumed.

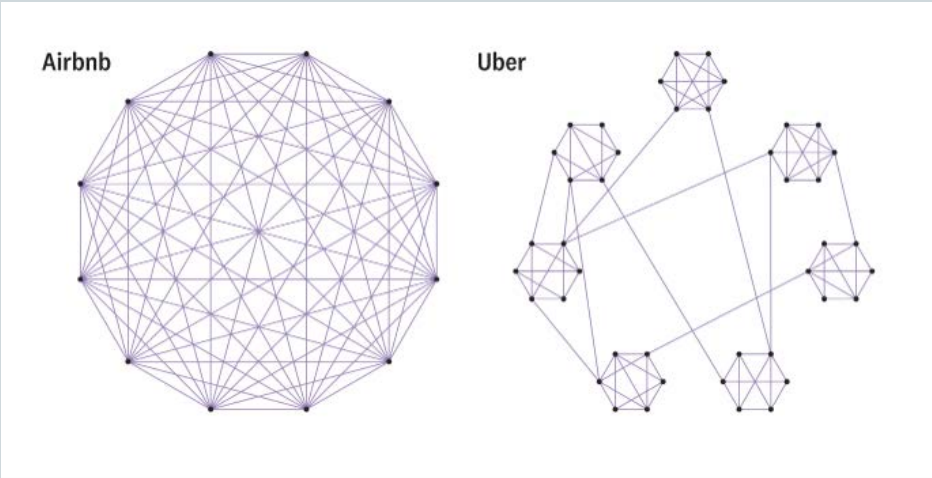
In general, platform defensibility is influenced by how local clusters are connected to each other (Zhu and Iansiti 2019). Networks with fewer connections between clusters (i.e. more segregated) are more difficult to defend than those with many connections (i.e. more interconnected). This is because when networks are more interconnected, there is a wider set of users who are relevant to the platform's user experience from an individual user perspective. In such a case, a competitor would need to target users on a much larger scale to achieve similar network effect benefits to the incumbent. When clusters are less interconnected, the network is more cleanly divided into smaller subgroups, and fewer users relevantly contribute to the value of the network from an individual user perspective. This means that competitors can more easily target smaller subsets of users and attain a smaller critical mass.[6]

In the case of highly segregated local clusters, competitors may enter the space, target specific user groups in a systematic fashion, and spread rapidly within that group. The threat of entry is compounded when we consider the fact that there is no explicit switching cost due to the lack of pricing in most social-media business models. In recent years, competing platforms such as Snapchat, Parler, and TikTok have had massive success in utilizing analogous entry strategies (e.g. targeting groups similar in demographic traits such as age, targeting groups which share political beliefs). This indicates that Facebook cannot rely on its limited network effects alone to retain the engagement of these individual groups in the face of competition.

Zhu and Iansiti (2019) compares the differing network structures of Uber and Airbnb as drivers of the two platforms' differing levels of competition and profitability. In short, one expects Facebook's network structure to more strongly resemble Uber's highly segregated structure than Airbnb's highly interconnected structure. This limits Facebook's network effects and opens the platform to competition.

[6] Heterogeneity of users also plays a role in platform defensibility. If user groups differ strongly from one another, the threat of entry is increased as a new entrant can cater features to specific groups of users (e.g. ephemeral messages and music video dances for Snapchat and TikTok targeting younger user groups, lack of platform censorship in the case of Parler).

Figure 1: Illustration of Airbnb and Uber Networks – Zhu and Iansiti (2019)



There are examples in the literature of analyses that measure the structure of the Facebook network. Among them is Ugander (2011), which includes analysis of intercountry friendship connections as is included in the below figure.

Figure 2: Normalized Country Adjacency on the Facebook Network – Ugander (2011)

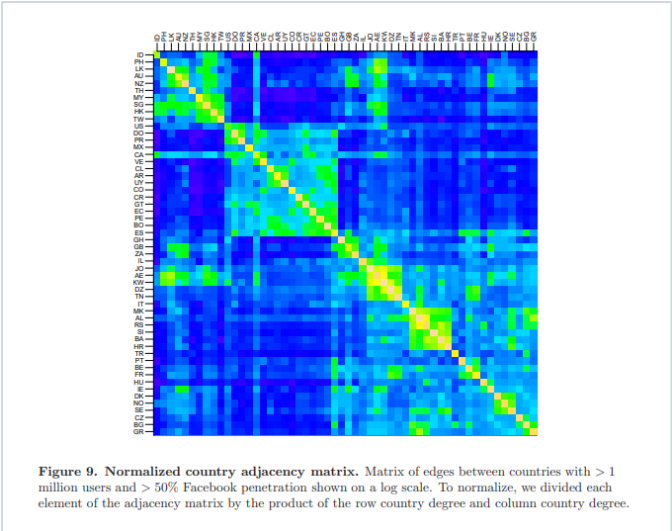


Figure 9. Normalized country adjacency matrix. Matrix of edges between countries with > 1 million users and > 50% Facebook penetration shown on a log scale. To normalize, we divided each element of the adjacency matrix by the product of the row country degree and column country degree.

In sum, the Facebook platform appears to exhibit a high degree of clustering and the connections between clusters appear relatively weak. This provides support to the view that network effects play a limited role in the appeal and defensibility of the Facebook platform, and that Facebook faces a competitive threat due to cluster-specific targeting by entrants such as Snapchat or TikTok.

3) Multi-homing

Multi-homing refers to user participation in more than one network. Multi-homing in social media is relatively easy, especially because many social media platforms are free of monetary cost to users. The cost of trying out a new platform is minimal, amounting only to the implicit costs associated with establishing and maintaining platform affiliation (e.g. time and effort to understand the interface). This makes it easier for users to gain exposure to variety of different platforms without having to leave a network.

Most social media users simultaneously interact with multiple different networks and have split their time between those networks as they see fit. In 2013, the majority of online adults in the US who used social media multi-homed across multiple websites (Duggan and Smith, 2013); between 2013 and 2017, the average number of social accounts held by global internet users almost doubled, from 4.3 to 7.6 (Valentine 2017). In this section, we explore how ease of multi-homing drives innovation and competition in social media, and how characteristics of Facebook's network make the platform especially susceptible to such effects.

Increased consumer exposure to potential substitutes weakens user reliance on any given platform, especially because social media users are able to split time between platforms (Jullien and Zantman 2019). Such ease of multi-homing implies that social media companies compete not just for usership, but also more granularly for users' attention (Davenport & Beck 2001). Additionally, the lack of friction in sampling competing platforms gives users visibility and awareness with regards to competing offerings, allowing them to selectively allocate time between platforms in an informed fashion. That is, platforms are forced to continuously innovate in order to retain users. This effect is particularly relevant to Facebook due to its wide variety of features and the localized clustering characteristic of its networks.

Facebook's high heterogeneity of uses allows competitors to compete for attention on specific types of interaction, rather than on Facebook's entire feature set. This means that Facebook users might multi-home on various networks in order to satisfy needs which might have otherwise been best fulfilled by Facebook. For example, because users can use both TikTok and Facebook with relative ease, a user might choose to view videos primarily through TikTok (rather than through Facebook's video tools) even if they use Facebook's platform for other purposes. This might be because TikTok's video features and style cater better to their specific needs. In this case, multi-homing on TikTok poses a competitive threat to Facebook, because it might reduce total time spend on Facebook. Mital and Sarkar (2011) indicates that even smaller platforms can pose a significant threat to an incumbent platform if multi-homing costs are sufficiently low and product features are differentiated. Facebook is therefore open to competition from any platform offering even one of its many features and must continue innovating across its platform to prove its merit to users.

Localized network clustering allows competitors to target specific user groups rather than the entire Facebook network. Targeting such local groups may allow entrants to quickly achieve sufficient scale for their product features to be effective. This is particularly important for users belonging to niche clusters, because the specific preferences of a smaller group for certain use cases might be more perfectly met by the offerings of a competing platform, especially when such targeting is intentional. It may be easier for users to maintain a network for a specific purpose when a network is specialized or separated by that purpose. Furthermore, cost is incurred on an individual level. This means that the total homing costs associated with shifting the attention of a smaller cluster to another platform are lower than the total homing costs associated with shifting the attention of the entire network. Facebook is therefore susceptible to competitors targeting attention from smaller subsets of its audience.

4) Multi-homing and innovation are indicators of competition in social media

A market with positive network effects is not necessarily winner-takes-all, and natural monopolies need not emerge, especially when users are able to multi-home across platforms (Cao, Jin, Weng, and Zhou 2018). The prevalence of multi-homing can both intensify and serve as an indicator of competition (Caillaud and Jullien,

2003, Halaburda and Yehezkel, 2013). Intuitively, multi-homing is an indicator that users actively use multiple platforms, not just a dominant incumbent platform. Further, multi-homing gives users exposure and choice with regards to the varying products they might interact with, forcing platforms to continuously innovate to remain competitive. This optionality prevents the lock-in of one dominant vendor and allows users to divide their attention amongst multiple platforms as they choose.

This lack of entrenchment aligns well with the competitive landscape we see in social media today. Despite Facebook's presence and incumbency, numerous platforms such as Twitter, Snapchat and TikTok have regularly entered the market and co-existed at scale. In order to keep pace, Facebook has regularly updated its features, despite the inevitable costs of such innovation. For example, as ephemeral content such as Snapchat stories began to consume more user attention, Facebook was pressured to innovate similar features to bring interested users back to the platform. The necessity of this type of innovation to maintain user attention share serves as evidence that Facebook faces substantial competition and lacks entrenchment.

F. Conclusion

While early discussions often took simpler views regarding the impact of network effects on competition, later work suggests that a more nuanced approach is necessary to understand the full spectrum of competitive implications. Network effects vary across industries, platforms, and even type of engagement, and should therefore be examined on a case-by-case basis. In particular, network-specific traits such as degree of clustering and prevalence of multi-homing can significantly influence the strength of network effects and their competitive effects, and network size alone is often misleading. We have found that such subtleties hold true for social media platforms such as Facebook.

Due to the structure of Facebook's network, the Facebook platform is unlikely to experience network effects strong enough to protect it from competition. Facebook's network effects are weakened by distinctive structural traits such as a high degree of clustering and segregation between clusters characteristic of the Facebook network and many other social networks.

Additionally, the prevalence of multi-homing in social media opens social media platforms to competition from rivals. The existence of competition in social media is evidenced by the regular entry and success of rivals, a strong user tendency to engage with competitors, and the necessity for constant innovation and investment by incumbents.

G. Appendix: Case studies

1) Orkut in India and Brazil: innovation can supersede incumbency

When multi-homing and innovation are pervasive, incumbency and dominance do not necessarily determine a winner. Consider the case of Orkut, a social media platform which launched more than two years before Facebook became available to the public. By July 2009, Orkut had maintained its steady lead in India, with 17.07 million active users over Facebook's 3.34 million active users. But despite this strong position, by July 2010, Facebook had overtaken Orkut in India, with 20.87 million active users versus Orkut's 19.87 million.[7] These platforms saw a similar flip in dominance in Brazil by December 2011.[8]

While Orkut was considered intuitive and simple at its inception, over time it had become slow and complicated. Orkut now lagged behind, unable to keep up with competition from Facebook's ever improving features and design.

Facebook enhanced its value to users through interactive and practical features. Business benefited from the marketing capabilities introduced by Facebook's page creation feature, which was not available through Orkut. Facebook also competed for user engagement through games and applications such as Farmville, which Orkut could not support. Additionally, Facebook focused on accessibility and boosting appeal to a wider audience. This is evidenced through developments such as mobile support, and universal plug-ins such as the "Like" button.[9]

Importantly, Facebook also excluded features which users had grown to disfavor. Orkut's recent visitors feature allowed users to determine which users had visited their profile. In contrast, Facebook's anonymity gave users a heightened sense of privacy. [10] Facebook also allowed users to limit visibility to their posts, by marking posts as private or "friends only" unlike Orkut which made user profiles open to all.[11]

Instead of updating Orkut's features or interface, Google released an entirely new social networking product, Google Plus. [12] This release signaled a new era. Google now faced internal competition from its own rival, cannibalizing its audience, and forsaking the development and sustainability of Orkut. In 2014, Google discontinued Orkut altogether.[13]

2) Twitter versus Facebook in Japan

Despite Facebook's popularity in North America, India, and others, there still remain several countries where Facebook has failed to become the dominant network. By 2019, only 20.6% of the Japanese population was using Facebook, compared to the 38.1% of the population using Twitter.[14] Notably though, in Japan Twitter was the incumbent, having been introduced in 2006, with Facebook being introduced later in 2008.

One reason for Facebook's low adoption in Japan might be the relative complexity of its features. Compared to other countries, Japan has a low smartphone adoption rate, with much of the population still using feature

[7] https://www.medianama.com/2009/07/223-facebook-usage-in-india-grows-as-orkut-misses-a-trick/
[8] https://www.zdnet.com/article/facebook-finally-overtakes-google-orkut-in-brazil/
[9] https://www.techinasia.com/indian-social-networking-wars-facebook-vs-orkut-2
[10] https://medium.com/@PachaelPhillip/case-study-reasons-why-googles-orkut-failed-after-facebook-was-launched-92dd8a7abf0
[11] http://www.differencebetween.net/technology/internet/difference-between-facebook-and-orkut/
[12] https://digiday.com/media/timeline-google-plus-demise/
[13] https://theprint.in/features/brandma/orkut-the-site-where-indians-made-frandships-before-facebook-came-along/244499/
[14] https://www.humblebunny.com/japans-top-social-media-networks/#facebook

phones.[15] Unlike Facebook, Twitter could be accessed via feature phones.[16] [17] This made the app more accessible to groups less likely to have strong smartphone or internet familiarity, such as the elderly. Thus, Twitter had an edge in attracting users from this niche subgroup, and many users have selected Twitter as a preferable alternative to Facebook on these simplified features.

Facebook's low adoption rates in Japan might also be influenced by characteristics (e.g. cultural preferences) specific to the local population. Facebook's platform requires that users create profiles identified by real names. Twitter, on the other hand, allows users to maintain a higher degree of anonymity, by permitting screen names to be created around alter egos or fictional characters. In Japan, this is more consistent with the preferences of the average internet user. Japanese web users, even popular bloggers, often post under pseudonyms or nicknames.[18] Because of this, Japanese Facebook users are more likely to use the platform to access business networks, fulfilling other potentially less formal social media uses elsewhere.[19]

Additionally, platform utilization might vary depending on context. The typical Twitter post (or "tweet") is limited to 280 characters. While this might be a fairly restrictive limit in English, Japanese written language is more compact, with each word constituting just one character. Thus, tweets are no longer limited to several sentences, but rather several paragraphs in Japanese. This additional functionality may boost Twitter's popularity in Japan as compared to countries with less compact written languages.

Despite the widespread popularity of Facebook's platform, Facebook has failed to become a one-stop-shop for social media users globally. This is the result of a confluence of factors, including cultural preferences, technological landscape, linguistic subtleties, and more.

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