Submission to the ACCC's Digital Platforms Inquiry

Network Effects

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1 Introduction

In its Preliminary Report on digital platforms, the ACCC claims that network effects on social media platforms have created barriers to entry and expansion that insulate Facebook from competition. According to the Preliminary Report, social media platforms exhibit both cross-side network effects between users and advertisers and same-side network effects among users:

> [T]he considerable scale of Facebook may serve to protect it from dynamic competition, through the operation of same-side and cross-side network effects.[1]

Network effects occur when the value of a product depends on others that are using the product.[2] As the ACCC observes, network effects can be cross-side, in which an increase in the number of users (e.g., software developers) on one side of a platform affects the value of the platform to another group of users (e.g., software users) on the other side of the platform. Network effects can also be same-side, in which an increase in the number of users of the same type affects the value of the platform to users (e.g., messaging service users).

In this submission, I present recent economic research and evidence in response to some of the claims concerning cross-side and same-side network effects raised in the Preliminary Report.[3] This research and evidence suggests that:

- network effects in digital environments are more complex and nuanced in nature than indicated in the Preliminary Report,
- network effects may be fragile, and
- network effects do not often entrench market power in digital environments.

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[1] 'Digital Platforms Inquiry: Preliminary Report,' *Australian Competition and Consumer Commission*, December 2018 ('ACCC Preliminary Report'), p. 50.

[2] Spulber, Daniel F. and Christopher S. Yoo, 'Networks in Telecommunications: Economics and Law,' *Cambridge University Press*, 2009.

[3] I have been retained by Facebook to prepare this submission. All the views expressed in this submissions are my own based on my research.

2 Cross-Side Network Effects for Advertisers

2.1 Overview of the Preliminary Report and cross-side network effects

The Preliminary Report suggests that cross-side network effects for advertisers give rise to barriers to entry for three reasons.

First, the Preliminary Report states that a platform with more users is able to offer advertisers a better return on their investment compared to platforms with fewer users:

> An increase in the number of users increases the number of users exposed to an advertising campaign, which may increase an advertiser's return from that campaign.[4]

Second, the Preliminary Report states that larger platforms with more data will enjoy cross-side network effects because the additional data would allow larger platforms to target ads more effectively than smaller platforms:

> A platform with more users has access to more data which can improve the relevance of ads presented to users. All else equal, an advertiser may prefer a larger platform, because its ad will tend to be more targeted.[5]

The Preliminary Report states that there are both economies of scale and economies of scope through data accumulation.[6] In particular, the Preliminary Report states that economies of scope arise from Facebook's ownership of several social media platforms:

> Facebook is able to access data from its various owned and operated sites— including the Facebook platform, Instagram, Messenger, WhatsApp—as well as from Facebook Audience Network. It can then use this large pool of data to improve the quality of the ad targeting service it provides for

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[4] ACCC Preliminary Report, p. 40.

[5] ACCC Preliminary Report, p. 40.

[6] In a recent paper, I discuss the difference between network effects and economies of scale through data. I also find that there is little empirical evidence of economies of scale through data. *See also* Tucker, Catherine E. 'Digital Data, Platforms and the Usual [Antitrust] Suspects: Network Effects, Switching Costs, Essential Facility,' *Review of Industrial Organization*, 2019.

advertisements sold on the Facebook platform, Instagram, Messenger and Facebook Audience Network.[7]

Third, the Preliminary Report states that having more users on a platform reduces the average fixed cost associated with setting up a campaign on the platform:

> An advertiser may incur fixed set-up costs from using a particular platform. There may also be fixed set-up costs of running a particular campaign. If there are more users on a platform, an advertiser and a campaign obtain more traffic, which in turns reduces the average fixed costs. All else equal, an advertiser is likely to prefer a large platform over a small one, on the grounds that running campaigns on the former has lower average fixed costs.[8]

I describe in this section some economic and industry-based reasons to question these particular mechanisms for cross-side network effects. First, the idea that more users on a single platform means higher returns for campaigns run on that platform no longer holds in a digital environment. Through programmatic advertising platforms, advertisers can connect seamlessly to consumers on hundreds of small websites and control where, when, and how often a potential consumer might see an ad. Second, more data does not necessarily mean better targeting. The data used to target customers on a website often does not come from the website itself. Instead, the data comes from brokers, who aggregate data across many websites and offline sources. Moreover, economic evidence suggests that any economies of scale from data are quickly diminishing with additional data, and there is little evidence of economies of scope. Third, more users on a platform do not reduce the average fixed cost associated with setting up a campaign on a platform. Another implication of advertisers programmatically purchasing digital ads is that the campaign can include hundreds of websites, and there is no additional cost to advertising on an additional website. Finally, I explain the role of multi-homing in mitigating any potential barriers to entry or entrenchment of market power.

2.2 More users do not mean higher returns for a campaign

The idea that more users necessarily leads to higher returns for campaigns run on popular websites reflects a 'Super Bowl' theory of advertising. According to this theory, advertising during

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[7] ACCC Preliminary Report, p. 51.

[8] ACCC Preliminary Report, p. 40.

the most popular TV events, like the NFL Super Bowl or AFL Grand Final, increases the returns to advertising by ensuring that the largest audience possible is reached with a single advertisement. This would mean that, in theory, an advertiser would not waste money by showing the same ad to the same person multiple times across the web in an effort to show the ad to as many people as possible.[9] A downside to a 'Super Bowl' strategy is that ads that are designed to reach the maximum number of users are by definition not targeted.[10]

Technological advances in digital advertising have changed the traditional reach-relevance tradeoff implied by the 'Super Bowl' theory of advertising. Advertisers do not need to show ads on popular websites both to reach large audiences and to avoid showing the same ad to the same person multiple times.[11] Instead, advertisers can now achieve large—and not duplicative—reach by showing the ad on multiple websites with small numbers of viewers and by using technology that tracks which potential consumers have already seen an ad. Programmatic advertising platforms that connect multiple small websites with advertisers means that these advertisers can target the same person on both large and small platforms and websites.[12]

The returns to advertising on a small platform may be just as valuable—or more valuable—to an advertiser than the returns to advertising on a large platform. Digital advertising prices are often based on user clicks and conversions. The value of a click on a small platform can be higher than on a large platform, and, depending on the price per click, the return may be higher as well.

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[9]   Of course, the main value of Super Bowl ads in the US is that people actually watch them (and even discuss them with friends) rather than ignore them.

[10] Despite digital advances, strategies that pursue mass-branding and spurn targeting are still popular. One of Australia's most famous marketing academics is a leading proponent of the view that firms should not target advertising. The question of how data improves targeting is irrelevant for these types of advertisers. *See* Cameron, Nadia, 'Binet: Digital Has Skewed Marketers too Far into Sales-driven Advertising,' *CMO*, 4 September 2018, available at: https://www.cmo.com.au/article/646133/binet-digital-has-skewed-marketers-too-far-into-sales-driven-advertising/; Ritson, Mark, 'Targeting or Mass Marketing? The Answer Is Both,' *Marketing Week*, 2 August 2018, available at: https://www.marketingweek.com/2018/08/02/mark-ritson-targeting-mass-marketing.

[11] *See* Tucker ACCC Submission dated 27 November 2018, section 4.1.1.

[12] Demand-side platforms ('DSPs') allow advertisers to purchase ads from many websites and supply-side platforms ('SSPs') allow publishers to sell ads to many advertisers. Programmatic advertising is the ability to purchase or sell ads in an automated manner. Advertisers and publishers can programmatically purchase and sell ads on DSPs and SSPs, buying from and selling to many different parties in the process.

Advertisers can therefore do just as well or even better by focusing on smaller platforms rather than seeking out large platforms to achieve higher returns.

The Preliminary Report does not acknowledge this technological development of programmatic advertising or the value of smaller platforms when it focuses on the size of platforms.

2.3 More data does not necessarily mean better targeting

2.3.1 Data for targeted advertising does not have to come from the website where the ad is shown

In its analysis of the sources of cross-side network effects, the ACCC appears to assume that advertisers are limited to data available from the media property where the ad is shown. However, as I discussed in my original submission, that is no longer the case.

Digital advertising has evolved such that advertisers can use data generated by users browsing one website to place a targeted ad on another website. One example that underscores this evolution is the partnership between the Australian website Carsales and the data broker Audience360. Using data on user browsing behaviour, Carsales has information about whether someone is likely to buy a car, and, if so, the car's type and model. Carsales partners with the data broker Audience360 to resell this information to advertisers. In doing so, the partnership enables third-party advertisers to reach exactly the type of consumers that might be interested in a Toyota Corolla, for example. Through its partnerships with multiple websites and online platforms, Audience360 can identify 90,000 Australians looking for Toyota Corolla vehicles on behalf of advertisers. They can also identify more than 200,000 Australians who have indicated their intent to travel to the United States, as well as 200,000 Australians looking to buy a new home.[13] Through data brokers like Audience360 and partnerships with websites like Carsales, advertisers can reach users with particular interests on many websites, independently of where the user actually indicated these interests.

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[13] Cameron, Nadia, 'How Carsales is Improving Audience Targeting with a Data Management Platform,' *CMO*, 11 May 2015, available at: https://www.cmo.com.au/article/574667/how-carsales-improving-audience-targeting-data-management-platform/.

In fact, users rarely indicate their interest for a product or a service through their interactions with a single website. Data that gives insight into consumer behaviour often is not unique, as consumers can spend a considerable amount of time searching online before ultimately purchasing items. As a result of this search, consumers leave their digital footprint on many different platforms. According to the CEO of Carsales, consumers often search for six months before buying a new car. This search behaviour is not unique to cars. According to a recent research study in the UK, the average purchase cycle from the first browse until purchase is approximately eight days for clothing and approximately 10 days for electronics.[14,15] The data users create as they search for a product or service provides advertisers with different ways to target their ads to consumers across a variety of websites.[16]

Moreover, advertisers can use different types of data to target potential consumers. For example, it is possible to identify people interested in buying a new professional camera from search and browsing behaviour on a broad variety of websites or from their prior spending data at speciality camera stores. It is also possible to identify people who might be interested in buying a new professional camera from profile data on where people live and the nature of holidays they take. These different types of data provide more opportunities for advertisers to learn about a user's interests and target ads.

2.3.2   *Economies of scale of data*

The extent to which additional data can improve an advertiser's ability to target users is an empirical question. Recent economic evidence suggests that the value of additional data—even

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[14]   'Browsing and Buying Behaviour 2016,' *Criteo*, Q3 2016, available at: https://www.criteo.com/wp-content/uploads/2018/01/Browsing-Buying-Behaviour-2016-UK.pdf.

[15]   In Australia, where the most popular categories of online purchases include clothing, tickets to events, books and movies and technology, the search patterns appear similar. *See* Goldring, Norrelle, 'Australian Online Shopping Behaviour,' *GfK*, 5 October 2017, available at: https://www.gfk.com/fileadmin/user_upload/country_one_pager/AU/documents/Australian_Online_Shopping_Behaviour_091017.pdf.

[16]   In some rare cases the data could be unique at a specific point in time. For example, a search for emergency termite fumigation services might provide unique information about an individual and her preferences for a short period.

seemingly relevant data about user behaviour—is often negligible. In a recent paper, I explore whether ad platforms that have access to more data profiles about users are better able to predict the gender or age of a user, which may be of interest to certain advertisers.[17] The sample of data brokers in the study is representative of leading data brokers in Australia who provide audience intelligence services to marketers. We find that digital profiles from these brokers are only able to correctly predict the gender of the consumer around 50 percent of the time. Moreover, there is no relationship between the amount of a platform's data and its ability to predict gender or age, suggesting that more data does not necessarily lead to better ad targeting.[18] Researchers in another recent study use Amazon data to explore whether having more sales data (more weekly sales observations) improves forecasting of future sales.[19] They find that, while additional data about a single product can improve Amazon's ability to forecast demand with diminishing returns to scale—meaning that, after a certain point, adding more data improves forecasted sales by very little—they find no evidence that adding more data about other products leads to improved forecasts. These results are also consistent with Google's practice of using only 0.1 percent subsamples of its data for its decision-support systems.[20]

2.3.3 Economies of scope of data

The ACCC further claims that Facebook will enjoy economies of scope due to its ownership of several social media platforms because the data will improve ad targeting across its platforms:

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[17] Neumann, Nico, Catherine E. Tucker, and Whitfield, Timothy, 'How Effective Is Black-box Digital Consumer Profiling and Audience Delivery?: Evidence from Field Studies,' *Conditionally Accepted, Marketing Science, April 2019*

[18] While Facebook often does have information about a user's gender, the value of gender in targeted advertising is limited. Except for select products that are specifically for men or women (for example, sanitary products or beard grooming products), most products are better targeted by using consumer segments that are clustered around an interest (such as haircare products or fly fishing equipment).

[19] Bajari, Patrick, Victor Chernozhukov, Ali Hortaçsu, and Junichi Suzuki, 'The Impact of Big Data on Firm Performance: An Empirical Investigation,' *National Bureau of Economic Research*, No. 24334, February 2008. This paper also examines formally the statistical properties of large data, and under what conditions more data leads to performance improvement and when it does not.

[20] Varian, Hal, 'Big Data: New Tricks for Econometrics,' *Journal of Economic Perspectives*, Vol. 2, No. 28, 2014, p. 4.

> Facebook is able to access data from its various owned and operated sites—including the Facebook platform, Instagram, Messenger, WhatsApp—as well as from Facebook Audience Network. It can then use this large pool of data to improve the quality of the ad targeting service it provides for advertisements sold on the Facebook platform, Instagram, Messenger and Facebook Audience Network.[21]

There is little evidence of economies of scope for data.[22] Moreover, data accrued on social media websites is repetitive both across time and across platforms. Since much of this data is repetitive, it is unlikely to provide a material incremental benefit for targeting ads. For instance, each additional baby picture that a user posts across various social media platforms provides little to no new information to an advertiser. To the extent that economies of scope for data exist, they will depend on the variety of web properties or digital insights any one company has access to.[23]

2.4   More users do not mean lower fixed costs

Advertisers usually do not incur fixed set-up costs from using a particular platform. Advertisers programmatically purchase digital ads through ad intermediaries on multiple platforms simultaneously. An advertiser can set up a campaign using an ad platform and gain access to many users across many websites, just as the advertiser would have access to many users on a larger platform.

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[21]   ACCC Preliminary Report, p. 51.

[22]   Bajari, Patrick, Victor Chernozhukov, Ali Hortaçsu, and Junichi Suzuki, 'The Impact of Big Data on Firm Performance: An Empirical Investigation,' *National Bureau of Economic Research*, No. 24334, 2018; Chiou, Lesley, and Catherine E. Tucker, 'Search Engines and Data Retention: Implications for Privacy and Antitrust,' *National Bureau of Economic Research*, No. 23815, 2017.

[23]   For example, News Corp owns not only digital media websites, such as news.com.au and Business Spectator, but also owns platforms that are dedicated to a multitude of other services, such as cooking recipes (bestrecipes.com.au), real estate listings (realestate.com.au) and marketplace lending (societyone.com.au). *See* 'Brands,' *News Corp Australia,* available at: https://www.newscorpaustralia.com/brands/.

There are many ad intermediaries that have the size and scope to support both small and large advertising campaigns. Intermediaries like AppNexus [24] and MediaMath [25] each provide advertisers with access to more than 500 publishers. These intermediaries also offer ad placements in various formats, including display, native, mobile, and connected TV. [26] The demand for programmatic advertising is expected to continue its rapid growth. Programmatic advertising expenditures in Australia increased from $83.7 million AUD in 2012 to $1.74 billion AUD in 2018, and are predicted to increase to $2.92 billion AUD by 2020. [27] This significant growth of ad intermediaries suggests that advertisers will continue to find more ways to expand their campaigns across websites and will not need to depend on any particular platform to reach users.

2.5 Multi-homing increases competition in markets characterised by cross-side network effects

The conclusion in the Preliminary Report that cross-side network effects create barriers to entry does not reflect that any potential effects would be mitigated by multi-homing. In particular, the Preliminary Report does not consider the extent to which multi-homing matters for advertisers.[28] Advertisers often use dashboards and cross-channel attribution/optimisation software that allow them to instantaneously optimise their advertising across multiple platforms by adjusting their bids and budgets across search, display and even offline channels. For instance, the programmatic advertising platform Adition Technologies offers a product that measures cross-channel

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[24] 'Buy in the Marketplace,' *AppNexus*, available at: https://www.appnexus.com/marketplace/buy ('AppNexus operates the world's largest independent marketplace with direct connections to 500+ publishers, including roughly 90 percent of the addressable comScore 200').

[25] 'Curated by the Numbers,' MediaMath, available at: http://www.mediamath.com/blog/wp-content/uploads/2018/05/Curated-Market-One-Year-Anniversary-Infographic.pdf.

[26] 'AppNexus Programmable Platform,' *AppNexus*, available at: https://www.appnexus.com/buy/appnexus-programmable-platform; 'Omnichannel DSP,' *MediaMath*, available at: http://www.mediamath.com/dsp/#dsp.

[27] Mitchell, Vanessa, 'Report: Two-thirds of digital media to be programmatic in 2019,' *CMO*, 21 Nov. 2018, available at: https://www.cmo.com.au/article/649878/report-two-thirds-digital-media-programmatic-2019/.

[28] ACCC Preliminary Report, p. 84.

performance and predicts online behaviours based on data about offline activities.[29] Another example of a cross-channel attribution software is Kenshoo, a platform that allows advertisers to manage campaigns across channels.[30] Similarly, as I highlighted in my previous submission, there are many other options for software that can measure marketing performance across different channels—a practice which is increasingly referred to as 'omni-channel marketing'—including Adobe Campaign, IBM Watson Marketing, Oracle Marketing Cloud, Salesforce Marketing Cloud, Conversion Logic, and SAS Customer Intelligence.[31] Advertisers can monitor their cross-channel marketing performance and allocate their marketing spend according to channels' returns on investment, thereby increasing competition among platforms.

3   Cross-Side Network Effects for Users

The Preliminary Report suggests that cross-side network effects may give rise to barriers to entry because a platform having more advertisers increases the value of the platform to consumers:

> If a platform has more advertisers, for any given user, the platform is able to serve ads that are more relevant to that user. For at least some users, being shown more relevant ads (as opposed to generic ads) improves the user experience. However, for other users, the serving of targeted ads could decrease their user experience due to privacy concerns.[32]

Much of my research has focused on the limitations of showing highly personalised advertising to users on platforms or media websites.[33] In general, without the perception of control over the

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[29]   'Attribution & Automation,' *Adition Technologies AG*, available at: https://www.adition.com/en/product-solutions/attribution-automation.

[30]   'Capabilities,' Kenshoo, available at: https://kenshoo.com/capabilities/.

[31]   *See* Tucker ACCC Submission, Section 3.2.2.

[32]   ACCC Preliminary Report, p. 40.

[33]   Tucker, Catherine E, 'Social Networks, Personalized Advertising, and Privacy Controls,' *Journal of Marketing Research*, Vol. 51, No. 5, 2014, pp. 546-562; Goldfarb, Avi, and Catherine Tucker, 'Online Display Advertising: Targeting and Obtrusiveness,' *Marketing Science*, Vol. 30, No. 3, 2011, pp. 389-404.

type of ads being shown, most users react negatively to highly personalised ads.[34] This finding suggests that concerns about personalisation may restrict positive cross-side network effects for users. Indeed, my research highlights that media devoted to highly specialised content   that cater to the interests of particular users (such as baby websites or travel websites) tend to have advantages in showing ads over more general websites—such as social media websites—that have to make inferences about what ads their users might find interesting.[35]

4   Same-Side Network Effects for Users

The Preliminary Report suggests that same-side network effects create barriers to entry on social media platforms because a user's perceived value of the platform depends on the number of other users participating on the platform:

> [I]f a large number of a user's social group and family are on the platform, then the platform will be relatively valuable for the user. As a consequence, large scale social media platforms, such as Facebook and Instagram, may have a greater ability to attract users than a smaller scale social media platform, such as Snapchat.[36]

I agree with the Preliminary Report that network effects for consumers exist on social networks and that these network effects are localised to the consumers' social groups. Recent analyses of network effects in digital markets, however, suggests that the potential implications for competition are not as problematic as the Preliminary Report claims. In an environment in which networks are embedded in social relationships which exist outside the platform with users multi-homing across platforms, users find it easy to follow their friends to alternative platforms. Network effects may

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[34] Without the perception of control, ads may also be seen as distracting or annoying. This challenge has been recognised by other social media platforms. For example, Pinterest, the visual bookmarking website and mobile app, highlighted that a primary way that its users interact on the platform is by sharing commercial content. According to Pinterest, 'The mutually beneficial alignment between advertisers and Pinners differentiates us from other platforms where ads can be distracting or annoying.' *See* Pinterest, Inc., *Form S-1,* 5 March 2019, available at: https://www.sec.gov/Archives/edgar/data/1506293/000119312519083544/d674330ds1.htm.

[35] Goldfarb, Avi, and Catherine Tucker, 'Online display advertising: Targeting and obtrusiveness,' *Marketing Science*, Vol. 30, No. 3, 2011, pp. 389-404.

[36] ACCC Preliminary Report, p. 51.

even be negative, especially in digital environments where users quickly adopt and change technology if other socially undesirable users join the network.

I explain below how network effects in digital markets are unlikely to reinforce the market power of incumbents.

4.1 Network effects may lead to instability instead of entrenching market power

The presence of network effects can cause the value of a product to increase or decrease dramatically within a short period of time. Network effects can accelerate changes and, importantly, not just in the direction of growth. Just as the increasing value of a growing platform may attract new users, the declining value of a shrinking platform may cause current users to switch to another option swiftly.

One example that highlights the instability of network effects is Friends Reunited, a social networking website in the UK that experienced substantial growth in the mid-2000s. Friends Reunited was named one of the ten most influential websites by Nielsen and celebrated as a 'massive presence' and 'one of the great undersung jewels in [broadcaster ITV's] crown,' referring to how highly valuable Friends Reunited was at the time to its acquirer, ITV.[37] Despite Friends Reunited's size, it quickly lost over half of its membership. Other social media platforms were able to attract users by appealing to younger audiences and charging lower prices.[38]

Another recent example of a social network that lost users rapidly was Yik Yak, an app that quickly gained traction on college campuses among students who were attracted by its anonymity feature and location-based messaging. In September 2014, Yik Yak was the second most

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[37] '"Most Influential" Websites Names,' BBC News, 31 December 2003, available at: http://news.bbc.co.uk/2/hi/technology/3356903.stm. Tryhorn, Chris, 'The Thoughts of Chairman Mike,' *The Guardian*, 7 March 2007, available at: https://www.theguardian.com/media/2007/mar/07/itv.television2.

[38] Clark, Nick, 'The Rise and Fall of Friends Reunited,' *Independent*, 21 February 2009, available at: https://www.independent.co.uk/news/business/analysis-and-features/the-rise-and-fall-of-friends-reunited-1628278.html.

downloaded social app, and the third most downloaded app overall.[39] However, by 2016 downloads of the app had fallen to a tenth of the level in 2014, and Yik Yak laid off 60% of its employees.[40] The ease and fluidity of the digital environment made it easy for students to try the app, but these same features also made it easy for them to disengage when the platform failed to innovate.[41]

Network instability can lead to tipping in the social media market space where a leading firm can emerge because of the sudden popularity of its platform. At the same time, the network instability induced by potential entrants provides an incentive for the incumbents to innovate and improve their product. The dynamic nature of competition between social media platforms and multi-homing by users and advertisers suggests that there is always a threat of potential entry that puts pressure on the incumbents, exemplified both by examples of failing entrants, such as Friends Reunited, Yik Yak and of successful entrants, such as Tinder, Reddit, Quora, Pinterest, and Tik Tok.

Given these industry dynamics, large companies have just as much incentive as small companies to innovate, as failure to do so may lead to stark consequences. For example, in 1998, Yahoo! reportedly received 95 million page views per day and was described by CNN as 'a kingmaker [who determines] which companies are successful and which are not.'[42] However, Yahoo!'s failure to innovate, most notably its late adoption of mobile technology and its increasingly

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[39]   Constine, John, 'Yik Yak's CTO Drops Out as the Hyped Anonymous App Stagnates,' *Tech Crunch*, 6 April 2016, available at: https://techcrunch.com/2016/04/06/yik-yuck/.

[40]   Safronova, Valeriya, 'The Rise and Fall of Yik Yak, the Anonymous Messaging App,' *New York Times*, 27 May 2017, available at: https://www.nytimes.com/2017/05/27/style/yik-yak-bullying-mary-washington.html.

[41]   Juetten, Mary, 'Failed Startups: Yik Yak,' *Forbes*, 13 November 2018, available at: https://www.forbes.com/sites/maryjuetten/2018/11/13/failed-startups-yik-yak/#744160635725.

[42]   'Yahoo! The Kingmaker,' *CNN Money*, 23 July 1998, available at: https://money.cnn.com/1998/07/23/redherring/redherring_kingmaker/#TOP.

obsolete search engine, quickly led to a dramatic decline as other companies outpaced it in both value and importance.[43]

The same competitive pressures to innovate are present today. Facebook has innovated such that the experience of using Facebook today is very different from using it at its inception—and even different from the experience of using Facebook five years ago. For example, the 'meaningful interactions' update in 2017 prioritised posts from users' friends and family over posts from brands and publishers.[44] Facebook has also innovated in advertising over the years, introducing new formats such as sponsored stories, video ads, and mobile ads as well as allowing advertisers to import their own data.[45]

4.2   Network effects are localised

Network effects often do not depend on the total number of users or connections in a network. What matters for network effects is having the right connections. In other words, network effects are usually localised and depend on the particular users that participate on the platform.

In my dissertation, I showed that an individual's adoption of a social network does not depend as much on the total number of potential connections in the network as it does on whether certain closely-connected individuals were part of the network.[46] I also showed that under normal conditions users were remarkably good at forecasting which connections influenced their adoption

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[43]   Frick, Walter, 'The Decline of Yahoo in Its Own Words,' *Harvard Business Review*, 2 June 2016, available at: https://hbr.org/2016/06/the-decline-of-yahoo-in-its-own-words.

[44]   Pollock, Sophia, 'Facebook Advertising & News Feed Algorithm History,' *Power Digital Marketing*, 7 March 2018, available at: https://powerdigitalmarketing.com/blog/facebook-advertising-and-news-feed-algorithm-history/.

[45]   Marvin, Ginny, 'Kenshoo Brings Search Intent To Social Retargeting On Facebook,' *Marketing Land*, 5 June 2014, available at: https://marketingland.com/kenshoo-brings-search-intent-social-retargeting-facebook-86338.

[46]   Tucker, Catherine, 'Identifying Formal and Informal Influence in Technology Adoption with Network Externalities,' *Management Science*, Vol. 54, No. 12, December 2008, pp. 2024-2038.

of a platform. Importantly, users were only influenced by the adoption by specific users, rather than—for example—the adoption of the networking technology by friends of their friends.[47]

Social media platforms like Facebook exhibit localised network effects which reflect social structures. Online social media platforms are based on offline relationships, which explains why they are so fragile. Because a user has real external relationships with their friends, it is easy for them to find out if their friends have deserted a social platform and follow them to another social media platform.[48] Localised network effects could also explain why not all major social media platforms are equally popular in all countries. For example, in a survey of 16 to 64 year old internet users in Russia, Facebook is the fourth most popular platform. YouTube is the most popular platform, followed by the websites vKontakte and Odnoklassniki. Among the most active social media platform users, 83 percent participate on vKontakte and only 39 percent participate on Facebook.[49]

The localised nature of certain networks paired with their instability suggests that when some share of users find a platform appealing, their decision to join affects others' decisions, leading to a rise in the popularity of the platform. This could also explain why younger demographic groups tend to adopt new platforms more quickly—their social relationships tend to be more fluid and, therefore, more affected by broader adoption rates than older users.[50]

4.3   Network effects can be negative

Network effects depend on others that are using the product, but they need not be positive. A network effect can be negative for several reasons. First, a network effect can be negative when

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[47]   Tucker, Catherine, 'Network Stability, Network Externalities, and Technology Adoption,' in *Entrepreneurship, Innovation, and Platforms*, 2017, pp. 151-175.

[48]   Tucker, Catherine, and Alexander Marthews, 'Social Networks, Advertising, and Antitrust,' *George Mason Law Review*, Vol. 19, No. 5, 2012, pp. 1211-1227.

[49]   'Digital 2019: The Russian Federation,' *we are social*, available at: https://datareportal.com/reports/digital-2019-russian-federation?rq=russia.

[50]   Tucker, Catherine, 'Network Stability, Network Externalities, and Technology Adoption,' in *Entrepreneurship, Innovation, and Platforms*, 2017, p. 5.

the network contains undesirable users or connections. It may be just as important to a user who *is not* on the network as who is on the network. In a recent study of the adoption of bitcoin at MIT, I found that when more mainstream users adopted bitcoin, early adopters of the cryptocurrency who were naturally more enthusiastic about new technologies decided to abandon bitcoin.[51]

In the case of social media platforms, certain users might deter other users from joining or cause them to leave the platform. For instance, a teen might want her friends to see her posts on Facebook, but not her parents. Some teens have indicated that the presence of older generations on Facebook is precisely the reason why they left the platform.[52] Greater adoption among older users might mean less adoption for younger generations, allowing for the entry of innovative platforms targeted at younger demographic groups.[53]

4.4 Multi-homing reduces market power

The advantages of network effects in potentially entrenching market power are constrained by user multi-homing across products and networks. Multi-homing reduces market power by lowering barriers to entry and increasing competition across platforms. The Preliminary Report recognises the presence of multi-homing in platforms that exhibit same-side network effects in its discussion:

> [S]uch same-side network effects may not preclude the entry of a niche or differentiated social media platform. For example, LinkedIn provides a professional network, providing the opportunity to establish contacts with other people for professional purposes. Snapchat provides a network that is especially popular for people in younger age demographics.

The extent to which users multi-home in a particular market can serve as an indicator as to whether network effects entrench market power. In the case of Microsoft, users' inability to use

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[51] Catalini, Christian, and Catherine Tucker, 'When Early Adopters Don't Adopt,' *Science*, Vol. 357, No. 6347, 2017, pp. 135-136.

[52] Sweney, Mark, '"Parents Killed It": Why Facebook Is Losing Its Teenage Users,' *The Guardian*, 16 February 2018, available at: https://www.theguardian.com/technology/2018/feb/16/parents-killed-it-facebook-losing-teenage-users.

[53] For example, recently when I presented research related to Facebook at Oxford University, the younger members of the audience expressed concern about the relevance of my research because they do not know other people who use Facebook anymore.

multiple operating systems embedded in separate pieces of hardware was cited as a concern in evaluating the relative power of Microsoft's network effects.[54] However, networks in the digital environment are more fluid as users multi-home across platforms. In particular, multi-homing is driven by a desire to separate different modes of communication with different types of acquaintances. For example, I use Facebook to communicate life events with high school friends, Instagram to post holiday photos, Twitter to communicate my ideas to colleagues, and LinkedIn to keep up with my students. The experience of the average Australian user is similar. App Annie, a mobile app market data and insights company, reported in 2017 that the average Australian uses five social networking apps per month, suggesting that users multi-home across multiple platforms for their social media and communication needs.[55]

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[54] Tucker, Catherine, 'Network Effects and Market Power: What Have We Learned in the Last Decade?' Antitrust, Vol. 32, No. 2, Spring 2018.

[55] Tyson, Daniel, 'App Annie Report Shows App Usage Breakdown for Australians,' *Ausdroid*, 5 July 2017, available at: https://ausdroid.net/2017/07/05/app-annie-report-shows-app-usage-breakdown-australians/.