Market tipping

Guidance for competition assessments

May 2025

Danish Competition and Consumer Authority

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Preface

Over the past decade, it has become increasingly clear that some markets evolve into monopoly-like structures, even without exhibiting all the typical characteristics of *classic* monopoly markets. This development is particularly evident in markets where digital platform services – such as online marketplaces, search engines, social media networks, web browsers, or operating systems – play a central role.

Whereas classic monopolies are primarily driven by supply-side factors such as high fixed costs, economies of scale, or control over critical infrastructure, digital monopolies are largely shaped by demand-side dynamics. These include network effects, data feedback loops, path dependencies, and the formation of digital ecosystems.

Markets that develop monopoly-like characteristics due to such demand-side forces are commonly referred to as tipped markets. The term reflects the idea that these markets pass a tipping point at which one firm gains a decisive advantage and emerges as the market winner. This tipping point may be reached, for example, when a firm's user base grows sufficiently large, or its data assets become sufficiently extensive, that competitors can no longer compete effectively. Once this point is reached, the market winner often enjoys a position of self-reinforcing dominance.

While tipped markets, like classic monopolies, may not always be harmful to consumers or society, they do raise competition concerns that may warrant regulatory intervention. With tipped markets and classic monopolies alike, the key policy objectives are the same: to prevent abuse of dominance, preserve market contestability, promote innovation, and safeguard consumer welfare. However, the distinct structural characteristics of tipped markets – especially when compared to traditional monopolies – call for a tailored approach to competition assessment and enforcement.

This report explores the market factors that contribute to market tipping and proposes a framework for assessing whether a market has, in fact, tipped. It then applies this framework in five case studies, each examining the state of competition through the lens of the identified tipping characteristics.

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Chapter 1
Introduction

1.1 Introduction

Several digital markets have developed into a state where one firm has become so large that other firms can no longer compete effectively. This process is referred to as **market tipping**. It describes how a market transitions from being contestable and competitive to being dominated by a single "market winner." Once a market has tipped, it is no longer contestable not just in the short term but often over the medium or long term. This typically occurs when certain competitive advantages – such as a large user base or access to vast amounts of data – become so significant for one firm that other firms no longer realistically can offer viable alternatives, attract customers and gain market traction.

When a market has tipped, new and existing customers essentially have no choice but to buy goods or services from the dominant firm or not buy them at all. Market tipping can therefore negatively affect the choices, prices, and quality of available offerings customers experience in everyday life.

Market tipping is relevant to assess in certain competition cases. It may be relevant in certain cases concerning abuse of dominance, though it may also be considered in relation to anti-competitive agreements. The European Commission has mentioned market conditions that may lead to market tipping in its 2009 guidance on the application of Article 102 TEUF on exclusionary conduct.[1] Additionally, the Commission's 2024 draft guidelines state that "*In general, the greater the extent of the dominant position of an undertaking, the more likely it is that its conduct is capable of having exclusionary effects*",[2] emphasising that it may be relevant to consider whether a market is prone to tipping or has already tipped, in order to correctly assess the behaviour from a dominant undertaking.

In addition to its relevance in competition cases, market tipping and the restrictive effect on market contestability are also acknowledged in the recitals of the EU's Digital Markets Act. Market tipping is explicitly mentioned as a justification for intervening in markets dominated by large digital platforms.[3]

Although market tipping has gained popularity as a concept with a seemingly shared understanding in the field, there is no general consensus about how it should be defined or specified, nor how it can be assessed in competition cases when the concept is relevant.

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[1] Paragraph 20 "*... Similarly, the conduct may allow the dominant undertaking to 'tip' a market characterised by network effects in its favour, or to further entrench its position on such a market.*" Communication from the Commission – Guidance on the Commission's enforcement priorities in applying Article 82 of the EC Treaty to abusive exclusionary conduct by dominant undertakings (2009/C 45/02).

[2] Draft Communication from the Commission - Guidelines on the application of Article 102 of the Treaty on the Functioning of the European Union to abusive exclusionary conduct by dominant undertakings (2024) Pt. 70 page 26, see **https://competition-policy.ec.europa.eu/public-consultations/2024-article-102-guidelines_en.**

[3] Reg. (EU) 2022/1925 (Digital Markets Act), cf. Recitals 25 and 26.

The purpose of this report is to describe how the Danish Competition and Consumer Authority will systematically assess whether a market has tipped or is likely to tip in the (near) future. The systematic approach may also be helpful in identifying and designing remedies to increase competition in markets that have tipped or are at risk of doing so.

Throughout the report, market tipping is discussed focusing on the economic market factors (including individual firm behaviour) that impact tipping. The report does not specifically discuss how to define relevant markets; however, it should be understood that the relevant market factors – and therefore market tipping – can be present at the global, regional, national or local level.

This report reviews existing economic literature regarding market tipping in the context of competition in digital markets, as well as Danish and EU competition case law to describe and discuss the theoretical concept of market tipping.[4] In doing so, the report identifies a list of market factors that are theoretically relevant to consider when assessing if a market has tipped or is about to. Those theoretical conclusions are then applied to a number of real-world cases – both in markets generally considered to have tipped and in those that have not – to evaluate the extent to which the theoretical understanding of market tipping satisfactorily explains the observed market developments.

What is market tipping and how does it happen?
Several factors influence the tipping dynamics, varying by industry and market-specific characteristics. In order to assess whether a market has tipped or is about to tip, the presence and strength of the following factors should be considered and evaluated.

A tipped market exhibits a self-reinforcing mechanism, typically driven by strong network effects. When a market has tipped, the size and/or quality of the "market winning" firm's user network becomes so large and/or high that competitors cannot realistically challenge the winning firm's market position. Whatever superior or innovative features – such as lower prices, better quality or different features – competitors offer, they are not sufficient to offset the value users gain from joining the winning firm's user network.

While network effects are essential, they are seemingly not sufficient on their own to tip a market. One or more complementary factors such as data advantages, scale benefits, user preference homogeneity, or single-homing behaviour due to various switching barriers have to be present for a market to tip. In some cases, it may even be that one of the "complementary" factors is the primary factor that leads a market to tip, in combination with etwork effects. For example, in markets where data is a central competitive factor, a large user network may provide the market winner with so much more/better data that competitors cannot realistically challenge the market winner.

This report identifies several factors that typically can contribute to market tipping, cf. Table 1.1 below. The presentation of the factors in the table should be understood such that if they are not present in the relevant market, they either do not contribute to, or they counteract, market tipping (e.g. *high* switching barriers increase the likelihood of market tipping, whereas *low* switching barriers decrease the likelihood of market tipping). The factors are discussed in

[4] This report focuses exclusively on the concept of market tipping in the context of competition law and digital markets. Literature on "tipping points" in other fields – such as financial markets (e.g., rapid stock price changes), or management theory (e.g., organizational change tipping) – is outside the scope and not relevant to the analysis presented here.

more detail in chapter 2, and can serve as a blueprint for which market factors to analyse when assessing if a market has tipped or not, or is about to.

By systematically assessing the presence and strength of these factors – individually as well as in combination – one can conclude to what extent a market has tipped or not, or is about to.

Table 1.1 **Market factors that typically contribute to market tipping**

Market factor	Description
Positive network effects	Positive network effects occur when the user value of a product or service increases as more users join, and these effects can be direct or indirect. The impact of network effects depends not only on the size of the network but also on its quality, which can be driven by factors such as user engagement, shared interests and the quality of interactions.
High switching barriers	Switching barriers are the financial, psychological, and procedural barriers users face when changing products, services, or platforms and include financial expenses, time, and effort spent on learning or setting up a new system. These barriers also encompass search costs for comparing alternatives and potential losses, such as loss of data or social connections.
High degree of single-homing behaviour	Single-homing occurs when customers in a given market tend to rely on one provider for a product or service and limit their interaction with alternative providers. It is a behavioural factor, and the degree of single-homing can be influenced by factors such as switching barriers, convenience and complexity - not just the technical possibility of multi-homing.
Data advantages	Data advantages refer to providers utilising user-generated data to improve their services. This market factor depends on access to data and the ability for a firm to successfully and efficiently utilise that data to gain or retain users (and their attention).
Scale benefits (economies of scale)	Scale benefits refer to cost advantages that firms gain as their scale of production increases, lowering the cost per unit by spreading fixed cost out over more units.
Presence of digital ecosystems (economies of scope and vertical integration)	Firms that offer multiple complementary services can create a digital ecosystem – a network of interconnected products and platforms that enhance overall value and promote user engagement. The ecosystem may consist of both horizontally and vertically integrated services and products.
First-mover and/or first-leader advantages (path dependencies)	First-*mover* advantages refer to the benefits gained by the earliest market entrants through for instance capturing customer loyalty and data accumulation, which can create barriers for potential new competitors. However, there are several examples of first-mover *dis*advantages, particularly in markets that are not yet mature. Later entrants may be able to leverage initial market experiences, improved conditions, or technology to surpass the earliest market entrants. As a result, second-mover, or first-*leader*, advantages may be more significant.
Free services	Free services are a strategy whereby providers offer services at no monetary cost to attract users, often in exchange for personal data and/or exposure to advertising. This removes price as a relevant competitive factor for potential rivals.
Product and preference homogeneity	If competing providers offer a relatively homogenous product, tipping is more likely than if providers differentiate their offerings. Similarly, if consumer demand favours homogenous products, tipping is more likely than if consumers prefer different varieties and features of a product.
Low degrees of interoperability	Interoperability refers to the ability of different platforms, systems, or applications to work together, either horizontally or vertically. A low degree of interoperability can create a lock-in effect, limit competition and create higher switching barriers.
Low pace of disruptive innovation	Innovation refers to the development and implementation of new technologies, features, services, or business models that enhance platform value, attract users, and possibly disrupt existing market structures. So-called disruptive innovation can alter existing market positions and reshape market dynamics. A low pace of disruptive innovation reduces the likelihood of competitors challenging the market leader.

Source: DCCA's own analysis.

For example, a market with strong positive network effects and high switching barriers is more likely to tip compared to a market with equally strong positive network effects but low switching barriers, all else being equal. Whether the switching barriers are sufficiently low to offset the tipping effect of the network effects is an empirical question that should be analysed on a case-by-case basis.

The list is not to be understood as exhaustive, since each assessment of market tipping requires careful consideration of market-specific factors that may influence the contestability dynamics of the market. Nor should it be understood that all the listed factors must be present for a market to tip.

Anti-competitive conduct can strengthen tipping factors

Various forms of anti-competitive conduct can reinforce or strengthen the tipping process by actively boosting the factors that drive it.[5] For example, a firm might enhance network effects through profit- or market-sharing deals with rivals, encouraging them to steer users to its service. It may also abuse its dominance by using exclusivity clauses, bundling or hindering interoperability in order to exclude competitors, strengthening its own position.

Such conduct can also suppress forces that would counter tipping. For instance, customer-sharing agreements may discourage a potential competitor from innovating. Similarly, reducing interoperability can stop users from using multiple providers, further entrenching the dominant firm's power.

Can a market "untip"?

By the above definition, a tipped market should seemingly not be able to untip – that is, revert to a state of effective competition after one firm has "won" the market – since tipping implies a self-reinforcing dominance that rivals can't overcome. If a market does "untip," it may suggest it was never truly tipped to begin with.

However, such a strict definition or interpretation is not warranted from an enforcement perspective.[6] It rests on the assumption that market conditions are fixed and unaffected by firm behaviour. In reality, changing market conditions and firm behaviour can influence whether a market stays tipped.

For example, a market-winning firm in a tipped market might innovate less once it secures the market – indeed, this is a central reason why market tipping can be detrimental to end-users. But if it underperforms, it could open the door for competitors to catch up, as seen in the web browser market (see chapter 4 of this report). This would be an endogenous shock – a disruption caused by the market-winning firm itself.

Markets can also untip due to exogenous shocks, such as technological breakthroughs or shifts in user preferences, but only if the market leader fails to adapt. Poor strategic decisions or lack of capability – like in the fall of film-based cameras, where the incumbent failed to respond the threat from digitalisation[7] – can prevent incumbents from responding effectively to

[5] Furthermore, it is also relevant to consider that market tipping may enable or strengthen the effectiveness of anti-competitive conduct by a market winning firm, e.g. insofar as the tipped state of the market enables it to impose higher prices or unfair conditions on users. However, the focus here is on factors that contribute to the tipping of a market.

[6] If one were to try to make the strict understanding of market tipping more workable by establishing e.g. a minimum number of years a market should be tipped, it would remove the possibility to remedy market tipping before it occurs. Additionally, it is also extremely hard to establish what the reasonable number of minimum years should be.

[7] Chunka Mui, Forbes, 18 January 2012, updated 14 July 2020, *How Kodak failed*, accessible at **https://www.forbes.com/sites/chunkamui/2012/01/18/how-kodak-failed/**.

technological breakthroughs. While it is currently too early to say, generative artificial intelligence (see chapter 7 of this report) may potentially disrupt current user shares in the market for general online search engines (see chapter 3 of this report).

Shifts in user preferences can also destabilise tipped markets. Since tipped markets are typically characterised by strong network effects, those reliant on strong network effects – like social media – are especially sensitive to changing preferences. In such cases, tipping may be less permanent (see chapter 5 of this report).

If neither endogenous nor exogenous shocks occur, regulatory intervention may be the only way to restore competition. This is explored further in the following sections.

Is market tipping always bad for consumers?

Market tipping can harm consumers since it reduces competition. When a firm "wins" a market, it gains the ability to extract higher profits (economic rents), often at the expense of consumer welfare. With limited competitive pressure, the dominant firm may have less incentive to innovate, reduce prices, or improve service quality. Instead, its focus often shifts to defending its position – for example, by blocking disruptive innovations – while firms in more competitive markets are motivated to compete through innovation and customer-centric improvements.

In other words, because market tipping implies that competition is significantly restricted, the well-known benefits of competition – consumer welfare but also increased productivity, employment, wealth creation, real wage growth and income equality – risk being substantially diminished.[8]

Even in markets that have not yet tipped but show characteristics of tipping (see Table 1.1 above), firms may be tempted to engage in anti-competitive practices – such as bundling, self-preferencing, profit-sharing, or predatory pricing – in hopes of dominating the market and later recover early losses through monopoly profits.

However, tipping is not always detrimental to consumers. In some cases – particularly where network effects and economies of scale are strong – a single provider may deliver greater overall value than a fragmented market with many small competitors. In such scenarios, tipping may actually reflect the efficient market outcome.

Market tipping in competition law cases

When a firm holds a dominant position, it must not engage in conduct that constitutes an abuse of its position. This includes exclusionary and exploitative practices that do not amount to competition on the merits, such as abusive bundling, leveraging, self-preferencing, or exclusionary agreements.

Once a market has tipped, the winning firm enjoys an entrenched position. Its conduct is therefore more likely to have exclusionary effects or to exploit its advantageous market position. The stronger the dominance, the greater the firm's ability to shape market dynamics – potentially weakening competition further and making it increasingly difficult for rivals to challenge its position.

[8] See Konkurrence- og Forbrugerstyrelsen (2022), *Konkurrence øger velstanden og kan reducere formue- og indkomstforskelle*, available at: **https://kfst.dk/media/odjj2jpi/20220708-konkurrence-oeger-velstanden.pdf** (in Danish) or the OECD's website for competition: **https://www.oecd.org/en/topics/competitive-and-fair-markets.html**.

Assessing market tipping may therefore be relevant in certain competition law cases – particularly in cases regarding abuse of dominance.

If the relevant market shows characteristics associated with tipping (see Table 1.1), an analysis of these factors can inform the assessment of whether a firm holds a dominant position or whether a specific conduct amounts to an abuse of dominance. For example, it may be relevant to consider whether the market has already tipped, or is likely to do so – also due to the conduct of the firm in question. This requires an assessment of the presence and strength of tipping factors on the defined relevant product and geographic market.

Moreover, the concept of market tipping may be relevant in other types of competition law cases. This was evident in the Bilbasen case (see chapter 6 of this report), where a car dealer association argued that it had to boycott the dominant platform. The issue of market tipping was raised as a possible justification, as an efficiency defense, of the boycott in question.

What role for regulatory intervention?

Regulatory intervention can also serve as an exogenous shock capable of untipping a market or at least putting a stop to harmful practices. This report aims to support competition authorities by offering a systematic approach to assess market tipping and identify proportionate remedies, but the approach proposed in this report could also be relevant for policy-makers.

A structured analysis of market tipping factors following the outlined systematic approach may be used to show whether the tipped state harms consumers – such as through reduced choice, higher prices, or stifled innovation, and thus whether regulatory intervention is warranted and can help lawmakers design effective interventions. This includes identifying which conditions to target and evaluating the likely impact of proposed measures.

The EU's Digital Markets Act (DMA) is a prime example.[9] One of its primary goals is to improve market contestability in digital markets dominated by the largest platform providers. In such markets, strong network effects, access to vast amounts of data, and economies of scale have created entrenched positions for certain "core platform services", which act as critical gateways between businesses and end-users (see chapters 3, 4, and 5 for an analysis of how some of these markets may have tipped, using the factors listed in Table 1.1).

The DMA imposes approximately twenty obligations on designated providers of core platform services. These include rules on data access, enhanced consumer choice, and restrictions on tying and self-preferencing, for example. It also introduces specific requirements for the notification of mergers and acquisitions by designated firms.[10]

In essence, the DMA aims to boost contestability by enabling rival firms to challenge incumbents, facilitating innovation, and strengthening the rights of business users and consumers to prevent unfair exploitation by dominant platforms. However, the DMA only applies to firms, services, and practices within its defined scope (designated gatekeepers). This means that some markets – despite showing signs of tipping – may fall outside its scope.

[9] Regulation (EU) 2022/1925.

[10] At the time of writing of this report, the first DMA non-compliance cases are being investigated by the European Commission, against Alphabet, Apple and Meta, see **https://digital-markets-act-cases.ec.europa.eu/search?caseInstrument=InstrumentDMA&sortField=caseLastDecisionDate&sortOrder=DESC**, accessed on 17 March 2025.

1.2 A systematic approach to assess market tipping

A systematic assessment of relevant market factors – both individually and in combination – offer a way to assess whether a market has tipped or is likely to do so. The likelihood of tipping, and the importance of specific market characteristics, varies across markets. This highlights the need for context-specific analysis. This report provides a non-exhaustive list of relevant factors when assessing whether a market has tipped or is likely to tip.

It is not possible to establish a general rule – for example, that a certain number of factors must be present in a market for it to (likely) tip. It is important to analyse both the presence, strength, and interaction of relevant factors as well as any untipping factors that may be present. While it is useful to evaluate each market factor individually, many are interrelated and influence one another. Thus, it is important to also consider any relevant potential synergies between factors (for instance, network effects may lead to significant data advantages). Conversely, care must be taken not to overstate the number of tipping factors present if they are actually manifestations of the same underlying condition (for example, single-homing may result from preference homogeneity or high switching barriers).

While network effects are central to market tipping, they are unlikely to be sufficient on their own to tip a market. Other factors – such as economies of scale, data advantages, switching barriers, or user preference homogeneity – typically need to be present before the DCCA would consider tipping likely.

This report sets out the DCCA's approach by breaking down market dynamics into identifiable components that can be assessed individually and in combination, cf. Box 1.1. This enables a clearer analysis of potential anti-competitive conduct, as specific firm behaviour can be linked to the particular market factor it influences. The same structured method can also guide the design of remedies to restore competition or improve market contestability. By dissecting the market into its key features, the likely effects of different interventions can be assessed and compared. When conducting such an assessment, whether in competition cases or in a policy context, it is important to be aware that a too broad market definition may incorrectly suggest substantial competition (a false negative), while one that is too narrow might indicate tipping when, in reality, sufficient competitive pressure exists (a false positive).

However, the mere fact that a market has tipped – or is about to – does not, in itself, justify regulatory intervention from a competition and consumer perspective. Some markets are naturally prone to tipping, and the outcome may not be harmful to consumers compared to realistic, alternative market outcomes. The systematic approach helps enforcers and practitioners assess whether tipping reflects natural competitive dynamics or has been driven by anti-competitive conduct. Finally, this approach aligns with established tools in competition law and economics, ensuring it can be integrated into existing enforcement frameworks.

Box 1.1

Systematic assessment of market tipping

1. Assess the extent to which the market tipping factors are present in the market.
2. Identify additional market-specific factors. Consider whether any unique characteristics of the market should be included in the assessment to fully understand its tipping dynamics.
3. Analyse the interaction between factors. Examine how the identified tipping and market-specific factors influence each other in order to draw a conclusion on the current state of the market – whether it has tipped, is likely to tip, or is not likely to tip.

Chapter 2
The market tipping concept

2.1 Definition

Market tipping occurs when a market transforms from a state of competition between many market players to a "winner-takes-all" scenario where one or few players dominate and face very limited competitive pressure. A tipping process is driven by multiple factors, with strong network effects being essential – but seemingly not sufficient on their own. A firm that successfully attracts a critical mass of users benefits from a '*snowball effect*' where its dominance gradually becomes self-reinforcing, making it increasingly difficult – or even nearly impossible – for competitors to challenge the firm. As a result, the firm ultimately "wins" the market.

In theory, a market may reach an equilibrium where the size of a firm's user network outweighs any other competitive factor. In practice, however, additional market characteristics such as economies of scale, data advantages, and the homogeneity of user preferences, seem necessary for a market to tip.

When a market tips, the "winner" can utilise its dominant position to extract substantial rents, negatively impacting consumers through higher prices, unfair conditions, or reduced innovation, similar to the effects seen in monopolistic markets. Furthermore, the winner might exploit its advantaged position in the tipped market to gain benefits in adjacent markets, potentially through anti-competitive practices.

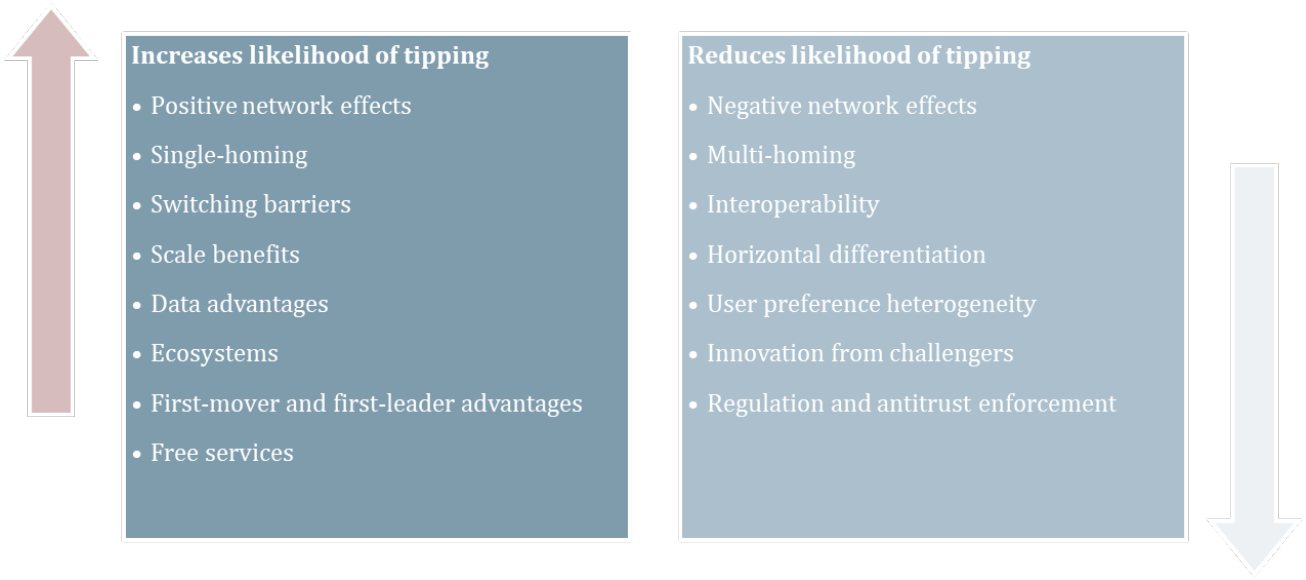
2.2 Market characteristics that can lead to tipping

Economic research suggests that multiple market features and factors influence the likelihood of market tipping, as summarised in Figure 2.1 below and further explained in the following sections.[11]

In addition to these market or product characteristics that increase the likelihood of tipping, a number of factors may also counteract a market tipping process. Moreover, such factors may play a role in "untipping" a market that has already tipped or in mitigating the adverse effects of market dominance by a single firm on consumers.

[11] In response to the Digital Markets Act a panel of economists stated "*The combination of economies of scale and scope, network effects, zero pricing, consumer behavioural biases, create new market dynamics with sudden radical decreases in competition ('tipping') and concentration of economic power around a few 'winner-takes-it-all/most' online platforms.*", see Cabral, L., Haucap, J., Parker, G., Petropoulos, G., Valletti, T. M., & Van Alstyne, M. W. (2021). The EU digital markets act: a report from a panel of economic experts. *The EU Digital Markets Act, Publications Office of the European Union, Luxembourg,* page 8.

Figure 2.1 **Market factors that impact the likelihood of market tipping**



Source: The DCCA's own illustration.

Positive network effects

Positive network effects occur when the value of a product or service increases as the number of (other) users increases.[12] Network effects can be both direct and indirect, and they can be both positive and negative.

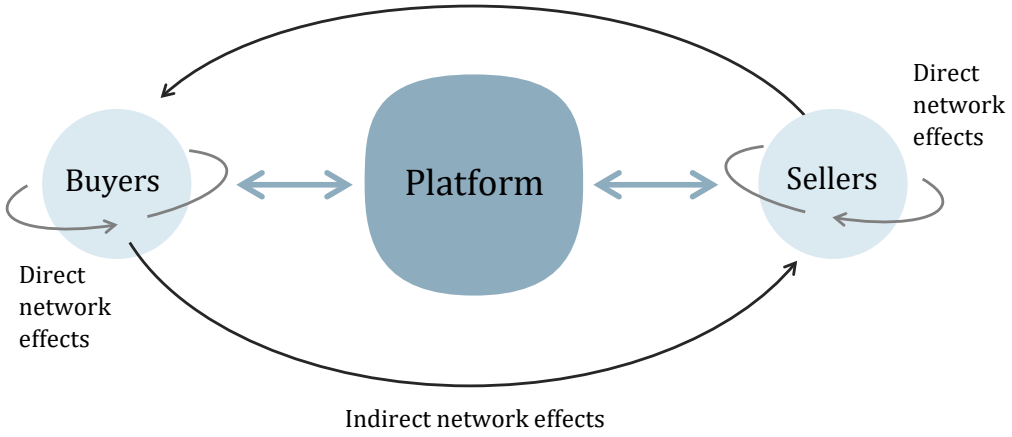
Direct network effects arise when each additional user directly enhances the value of a product og service for other users on the same "side" of the platform. For instance, social media platforms exhibit strong direct network effects, as the value of being on the platform increases for an individual with the number of other users (e.g. one's friends or professional contacts) on the platform.

Indirect network effects arise when the increase in number of users on one side of the platform leads to an increase in user value for users on the other side.[13] Online marketplaces or food delivery platforms, for instance, demonstrate substantial indirect network effects, as the value for buyers increases with the number of sellers on the platform, and vice versa, as illustrated by Figure 2.2.

[12] Commission decision of 3 October 2014 in Case M.7217 – *Facebook/WhatsApp*, para. 127.

[13] Caillaud, B., & Jullien, B. (2003). Chicken & egg: Competition among intermediation service providers. RAND journal of Economics, 309-328, page 310.

Figure 2.2 **Positive network effects**



Source: DCCA's own illustration.

The above examples illustrate positive network effects. On the other hand, negative network effects operate in the opposite manner – occurring when an increase in user numbers leads to issues such as overcrowding, excessive advertising, or overuse of platform resources.[14] The latter might arise when an increase in the number of users results in a decline in customer service or product quality (e.g. if the platform becomes "slow" or malfunctions). In such cases, the platform may lack the capacity to effectively manage the user volume and deliver its services at an optimal level.

It is also possible for (indirect) network effects to remain positive only up to a certain point, or as long as the growth in user numbers is balanced across the two or more sides of the market.[15] For example, ridesharing apps require sufficient numbers of both passengers and drivers. However, if the number of passengers significantly exceeds the number of available drivers, waiting times may increase, leading to negative network effects.

Moreover, direct and indirect network effects may differ in direction: direct effects can be positive while indirect effects are negative – or vice versa. Empirical studies of newspapers have found that indirect network effects tend to be more pronounced for the advertiser side, since advertisers derive increased value with the number of readers, whereas readers may

[14] Bedre-Defolie, Ö., & Nitsche, R. (2020). When do markets tip? An overview and some insights for policy. *Journal of European Competition Law & Practice, 11(10), 610-622* page 617.

[15] For an illustration of the demand curve see: **https://www.researchgate.net/figure/The-network-demand-curve-the-idea-of-optimal-size-large-further-growth-has-less-value_fig3_320877962**. From the bell shape of the demand function it follows that there might exist more than one network size that satisfies the equilibrium condition for a given price. The multiplicity of equilibria follows directly from the coordination problem induced by the presence of network effects since network effects can affect consumers' utility differently, see Belleflamme, P., & Peitz, M. (2015). *Industrial organization: markets and strategies*. Cambridge University Press page 589-590.

experience diminishing value if the number of ads increases.[16] Similar patterns have been observed by e.g. the DCCA with regards to online search engine advertising.[17]

Empirical research also highlights that network effects are influenced not only by the size of the network but also significantly by its quality.[18] Network quality can be enhanced by factors such as a strong sense of community or shared attributes – personal interests, demographic characteristics, brand loyalty, political views, and so on.[19] This is particularly evident on social networking services, where the primary value for users lies not in the total number of platform users, but rather the specific types of users who are part of their network. Likewise, a ridesharing app is unlikely to offer greater value to passengers simply by having a large pool of drivers – especially if many of them are considered unsafe.

Effect on the likelihood of tipping

Strong network effects can drive market tipping by creating a positive feedback loop, often referred to as a "snowball effect", in which the network grows to such a size that it in itself becomes the primary attraction for new users to join.[20]

Economic literature highlights, that network effects are a critical factor in determining the likelihood of market tipping. However, while network effects are important, they are not by themselves sufficient to determine whether a market will tip or not. Other factors may either amplify or mitigate the tipping effect created by positive network effects. For instance, the extent to which users can engage with alternative products or services simultaneously (multi-homing) can serve as a counterbalancing factor. In other words, if a market is dominated by one single actor merely due to having reached a critical mass of users, without leveraging the network advantage to consistently outperform or suppress competitors, it is unlikely that the market has truly tipped.

High switching barriers

Switching barriers refer to the economic, psychological, and procedural barriers that users face when switching from one service or platform to another. These costs may include financial expenses, such as exit fees or start-up costs, as well as perceived costs related to time and

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[16] Konkurrence- og Forbrugerstyrelsen (2021), Konkurrencen på markeder med digitale platforme (in Danish). See also Kaiser, U., & Wright, J. (2006). Price structure in two-sided markets: Evidence from the magazine industry. International Journal of Industrial Organization, 24(1), 1-28 and Van Cayseele, P. J., & Vanormelingen, S. (2009). Prices and network effects in two-sided markets: the Belgian newspaper industry. Available at SSRN 1404392.

[17] Konkurrence- og Forbrugerstyrelsen (2023), Betydningen af annoncer for forbrugernes adfærd på onlinesøgemaskiner (in Danish).

[18] Armstrong (2006) suggest that "*The strength or magnitude of these externalities is a crucial factor in determining the structure of prices in two-sided markets. Stronger network effects intensify competition and can lead to lower prices for both groups on the platform.*" See Armstrong, M. (2006). Competition in two-sided markets. *The RAND journal of economics, 37*(3), 668-691. Further, as an example "*the number of users might not be the right measure of network effects when users on one side have tastes for a variety of services or products on the other side of the market (e.g. a listing platform like Craigslist or Airbnb). In order to challenge a dominant player in such markets, a rival would need to attract a wide variety of types of sellers or listings to make its platform at least as attractive as the dominant platform for buyers. This might make the entry or survival of a small rival more difficult compared to a situation where platforms offer homogenous products and services, like ridesharing from A to B, where simply increasing the number of users on both sides would be sufficient to get the network effects to work.*" See Bedre-Defolie, Ö., & Nitsche, R. (2020). When do markets tip? An overview and some insights for policy. *Journal of European Competition Law & Practice, 11(10), 610-622* page 612.

[19] Konkurrence- og Forbrugerstyrelsen (2021), Konkurrencen på markeder med digitale platforme (in Danish).

[20] The CMA market study July 2020 *Online platforms and digital advertising*, page 133: **https://assets.publishing.service.gov.uk/media/5fa557668fa8f5788db46efc/Final_report_Digital_ALT_TEXT.pdf.**

effort, such as learning and setting up a new system, or the loss of benefits associated with the initial provider.[21]

Switching barriers also include search costs, which refer to the time and effort required to find and compare alternative offers. In some markets, such as insurance, the actual monetary costs of switching may be low, but the complexity of gathering and comparing information about coverage bundles and pricing structures can deter consumers from switching. In other markets, particularly service markets, prices and other terms and conditions may be relatively transparent, but it can be difficult to assess and compare the quality of different providers in advance.

Other examples of switching barriers include the loss of historical data, such as when a user switches from one music streaming service to another and loses access to playlists and personalised recommendations built up over time (i.e. a lack of interoperability between different providers; interoperability is discussed later in this chapter). Another example is social loss, where leaving a social network may result in the loss of personal connections and communities cultivated over many years.

Effect on the likelihood of tipping

High switching barriers significantly contribute to single-homing behaviour and create user lock-in scenarios.[22] These barriers make it more challenging for users to transition to alternative providers, thereby increasing the likelihood of market tipping by reinforcing the network effects and the dominant position of a winning firm.

High degree of single-homing behaviour

Single-homing refers to a market scenario in which a user – whether a consumer or a firm – relies exclusively on a single provider for a specific service. For instance, this occurs when a user consistently uses a single hotel booking platform for all reservations, or when an app developer creates apps exclusively for a single operating system.

The alternative scenario is multi-homing, where users engage with services from multiple providers simultaneously, rather than relying on just one.[23] For instance, a user may use multiple booking platforms for different hotel reservations, effectively "shopping around" for the best deal. Likewise, an app developer may create apps for several operating systems instead of committing to just one.

In many two- or multi-sided markets, it is common for users on at least one side to multi-home. Examples include video streaming platforms, where users subscribe to multiple services; social media platforms, where individuals maintain accounts on different networks; or payment cards, where consumers often carry cards from several providers.[24]

The degree of single-homing does not simply reflect whether it is technically possible for users to multi-home. Rather, it depends on a range of factors that influence user's costs of using multiple providers, encompassing not just financial costs but also costs related to time and

[21] See Farrell, J., & Klemperer, P. (2007). Coordination and lock-in: Competition with switching costs and network effects. *Handbook of industrial organization*, 3, 1967-2072 or Burnham, T. A., Frels, J. K., & Mahajan, V. (2003). Consumer switching costs: A typology, antecedents, and consequences. Journal of the Academy of marketing Science, 31, 109-126.

[22] Burnham, T. A., Frels, J. K., & Mahajan, V. (2003) find that switching costs like financial, procedural and relational switching costs significantly influence consumers' intentions to stay with their current service provider.

[23] Armstrong, M. (2006). Competition in two-sided markets. The RAND journal of economics, 37(3), 668-691.

[24] Konkurrence- og Forbrugerstyrelsen (2021), Konkurrencen på markeder med digitale platforme (in Danish).

convenience. In some markets, even where it is technically possible (and free of charge) to multi-home, other factors such as default-settings can lead to a high degree of single-homing. Therefore, assessing the degree of single-homing in a market often requires examining not only the size of the various relevant switching barriers, but also gaining insights into actual user behaviour. For instance, using multiple search engines is free and just a click away, yet most users rely on a single search engine for all their searches.

Effect on the likelihood of tipping

Single-homing limits users' interaction with alternative providers and increases the likelihood of tipping.[25] Single-homing is often driven by high switching barriers, user convenience, strong network effects, default settings and the benefits offered by the chosen platform.

When users single-home, it amplifies network effects – since a provider may not only have a large user base, but an exclusive one. This creates lock-in effects, raises barriers to entry for competitors, fostering a winner-takes-all dynamic and increases the likelihood of market tipping.

According to the UK Competition and Markets Authority (CMA): "*In markets characterised by network effects, consumer multi-homing can help smaller platforms develop their customer base, increase the competitive pressure faced by incumbents such as Facebook and prevent the market from 'tipping'*".[26]

However, even in markets characterised by a high degree of single-homing, it does not necessarily mean that the market will tip in one provider's favour. For example, if users have diverse preferences, the market may still remain competitive even if most users single-home. One such case is the newspaper industry; although most consumers subscribe to just one morning newspaper, this has not prevented the coexistence of many competing newspapers on the market.

Data advantages

Data advantages, sometimes referred to as data-enabled learning, is the process where providers utilise data generated by their users – potentially combined with other data sources – to continuously improve and refine their services. This enhancement of service quality not only improves user experience but also attracts new users and retains existing ones, thereby creating a virtuous cycle.[27] Data advantages leverages the insights gained from user data to gain a competitive advantage, including both access to data as well as the ability to convert that data into profitable improvements using appropriate analytical and data-processing tools.

It should, of course, be noted that simply having access to large amounts of data is not sufficient to gain a competitive advantage from data-enabled learning. As the volume of data generated on a platform increases, the platform provider must successfully develop analytical tools to, for example, distinguish relevant (high-quality) data from irrelevant (low-quality) data for each specific analysis. In addition, the platform must have the necessary data center capacity, infrastructure, and security measures to handle large data volumes.

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[25] Rysman, M. (2009). The economics of two-sided markets. Journal of economic perspectives, 23(3), 125-143.

[26] The CMA market study July 2020 *Online platforms and digital advertising* page 136: **https://assets.publishing.service.gov.uk/media/5fa557668fa8f5788db46efc/Final_report_Digital_ALT_TEXT.pdf.**

[27] Hagiu, A., & Wright, J. (2023). Data-enabled learning, network effects, and competitive advantage. *The RAND Journal of Economics, 54*(4), 638-667.

For example, social media platforms use data-driven learning to optimise the posts and ads that users see in their feed, while also improving the efficiency of their advertising platform. Likewise, large general search engines analyse user query and click data behaviour to refine their search results – particularly for rare or complex queries that smaller search engines may struggle to handle. These insights can also be used to present information directly within search results, eliminating the need for users to click through to third-party websites.

The provider's ability to gain a competitive edge from data is often closely linked to the strength of its network effects, since larger user bases – other things being equal – generate more data. That said, it is not necessarily the size of the available data sets that matter – "*It's no use having a lot of data if it's bad data*"[28]. Platforms with a large user base are often better positioned to derive more detailed and accurate insights into user behaviour and preferences – and to do so more quickly than competitors with fewer users. Such insights can then be used to improve the service according to the identified user preferences, as well as to sell targeted advertising space, which has proven to be a highly successful business model.[29]

Effect on the likelihood of tipping

While positive network effects can enhance a provider's ability to gain a competitive advantage from data, it is important to consider these two factors separately. Data advantages, or the importance of data-powered insights for commercial success, can significantly impact the likelihood of market tipping on its own. As with network effects, in markets where data is a key competitive factor, a firm that reaches a critical mass (and quality) of relevant data is – all else being equal – more likely to pull ahead of competitors by leveraging the insights derived from that data. In reality, however, this advantage depends on the firm's technical and commercial ability to translate those insights into valuable service improvements.

To the extent that data advantages reinforce or strengthen the network effects, the two factors become complementary, creating a positive feedback loop that boosts a provider's competitive advantage. As a platform gains more users, it generates more data, which in turn enhances its ability to attract and retain even more users. In some cases, access to an individual's data can also increase the provider's ability to collect even more data about that individual across services or over time. [30] Data advantages therefore function as a mechanism that can enhance both the value of the platform and its competitive advantage by making it more effective at satisfying users' needs.[31]

The DCCA experience that, in some markets, data advantages are the primary driver of user value, with network effects playing a supportive role by enabling access to larger and more diverse datasets. This dynamic is particularly relevant in markets where the user value increases as a result of the provider's ability to analyse and apply data-driven insights to improve the product, such as in the search engine market.

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[28] Google, Machine Learning Foundational Courses, **https://developers.google.com/machine-learning/data-prep/construct/collect/data-size-quality**, accessed March 17 2025.

[29] For example, in 2023, 98 pct. of Meta Platforms' annual revenue came from advertising (**https://www.statista.com/statistics/271258/facebooks-advertising-revenue-worldwide/** and **https://www.statista.com/statistics/277229/facebooks-annual-revenue-and-net-income/**, accessed March 17 2025) and 78 pct. of Google's revenues came from advertising (**https://www.statista.com/statistics/1093781/distribution-of-googles-revenues-by-segment/**, accessed March 17 2025).

[30] Crémer, J., De Montjoye, Y. A., & Schweitzer, H. (2019). *Competition policy for the digital era*. Publications Office of the European Union. **https://data.europa.eu/doi/10.2763/407537**, p. 31.

[31] Konkurrence- og Forbrugerstyrelsen (2021), Konkurrencen på markeder med digitale platforme.

In this context, an individual's decision to use a particular search engine is arguably not driven by the fact that other individuals use the same search engine – i.e. it is not a network in that sense. Rather, the large user network contributes to individual user value by enabling the search engine to analyse vast amounts of data to improve its search algorithms and other features of the search engine. This ensures that users return to the same search engine for their online search needs.

The example of Google Search in this context is discussed further in chapter 3.

Scale benefits (economies of scale)

Economies of scale refer to the cost advantages that firms achieve as their scale of operation increases. The cost per unit of output generally decreases as production expands, since fixed costs are spread over a larger number of units. In other words, the more units a firm produces, the cheaper it becomes to produce each unit – up to the point where maximum capacity is reached and additional investments are required to expand production further.

Scale benefits promote large-scale production, which in turn fosters market concentration, in some cases resulting in a few (or only one, in the most extreme cases) providers serving the entire market demand.

Scale benefits differ from network effects

Scale benefits may resemble network effects, since both increase a firm's competitiveness as its user base grows, but they arise from different mechanisms. According to the European Commission "*At first sight, the consequences of (positive) network externalities for competition are similar to those of increasing returns to scale: large platforms are more efficient than smaller ones leaving space for only a small number of platforms in the market. Indeed, a large platform provides a more valuable service, e.g. access to more users for a one-sided platform, than a smaller one. There is, however, a subtlety here. The benefits of increasing returns to scale are due to technological conditions. The benefits, for an incumbent platform, of network externalities are due to the difficulty for users to coordinate migration to a new platform.*"[32]

Scale benefits relate to the cost structures – for example, the technological and operational activities required to deliver a digital platform to users. Network effects, on the other hand, relate to user behaviour, specifically the coordination efforts required for users to select one platform over others or to (collectively) switch from one platform to another. Put simply, scale benefits concern the supply-side of the platform: larger platforms achieve lower per-unit production costs and can offer better features due to their operational efficiency. Network effects concern the demand-side: users are more inclined to join platforms that already have many users and/or content providers.

Effect on the likelihood of tipping

Scale benefits increase the likelihood of market tipping by driving supply-side concentration. Large-scale production is more efficient than small-scale production, especially in markets characterised by high fixed costs and low marginal costs – a common feature of digital platforms and many IT services.

[32] Crémer, J., De Montjoye, Y. A., & Schweitzer, H. (2019). *Competition policy for the digital era*. Publications Office of the European Union. **https://data.europa.eu/doi/10.2763/407537**, p. 23.

However, as with data advantages, scale benefits must be effectively leveraged to maintain competitiveness. For instance, as discussed in the case study on web browsers (see chapter 4), Microsoft failed to remain competitive despite holding 95 pct. user share – largely due to a lack of innovation and failure to improve the product.

Thus, scale benefits seem to be a central contributing factor to market tipping, though they can be offset by other factors. For example, in markets with network effects, a challenger that possesses unique data and/or a superior ability to utilise data may be able to overcome the incumbent's scale advantage. That said, the larger the scale of the incumbent, the greater the challenge for a rival to succeed.

Presence of digital ecosystems

Firms or platforms that offer multiple complementary services can create a digital ecosystem – a network of interconnected products, services and platforms that enhance the overall value of the platform and promote user engagement.[33]

One example of a firm with an extensive ecosystem is Google, which has expanded beyond its original role as a search engine provider. Today, it is active in markets such as web browsers (Chrome), operating systems (Android), and video streaming (YouTube). Microsoft as well has created a comprehensive ecosystem, including the Windows operating system, the Edge web browser, the Office software suite, LinkedIn, Azure cloud services, and Xbox gaming services – alongside a wide range of IT-related software offerings. Apple similarly offers an integrated ecosystem of hardware (e.g. iPhone, MacBook, Apple Watch, etc.), its own AppStore, operating systems, web browser and other services.

Effect on the likelihood of tipping

If a firm can attract users across multiple markets – through enhanced interoperability, compatibility, and cross-service convenience – competing providers that lack such breadth may struggle to attract or retain users in individual markets. A firm with an ecosystem active in multiple markets may also increase barriers to entry for new firms entering any one of those markets.[34]

Furthermore, firms with ecosystems may leverage data and user engagement across their services to improve the performance of individual services, increasing user retention and further expanding their customer base. According to a panel of economists "*Innovative digital firms and start-ups find it difficult to compete with these very large online platforms. Their impact is compounded by the opacity and complexity of their large ecosystems, and the significant information advantage they have over business users.*"[35]

Ecosystems can therefore reinforce a firm's market position by increasing switching costs (e.g. a user relying on a digital map service may be less likely to switch if the provider also offers an integrated browser, search engine, and email service), enhancing data advantages and network effects, making it more difficult for competitors to enter the market or challenge the

[33] Konkurrence- og Forbrugerstyrelsen (2021), Konkurrencen på markeder med digitale platforme.

[34] "*Enveloping a variety of services to the core products and services of a platform enables the platform to move its market position from its core market to the markets that it envelops*" Bedre-Defolie, Ö., & Nitsche, R. (2020). When do markets tip? An overview and some insights for policy. *Journal of European Competition Law & Practice, 11(10), 610-622* page 615. Further, see Konkurrence- og Forbrugerstyrelsen (2021), Konkurrencen på markeder med digitale platforme.

[35] Cabral, L., Haucap, J., Parker, G., Petropoulos, G., Valletti, T. M., & Van Alstyne, M. W. (2021). The EU digital markets act: a report from a panel of economic experts. *The EU Digital Markets Act, Publications Office of the European Union, Luxembourg,* page 8.

dominant firm's position. In this way, ecosystems can increase the likelihood of tipping in each individual market where an ecosystem firm operates.

However, having an ecosystem is not a necessary factor for market tipping. A firm with, for instance, a significant data advantage (and ability to successfully exploit it) in a market with strong network effects but sufficiently limited economies of scale, could still outperform an ecosystem-based competitor. In such cases, an ecosystem firm looking to enter the market may find it more attractive to merge with or acquire the incumbent rather than trying to outcompete it.

First-mover and/or first-leader advantages

First-mover, or incumbency, advantages refer to the benefits gained by first movers or early entrants in a market, which can make it difficult for new competitors to enter and succeed.[36] These advantages are often established through strong network effects, customer loyalty, and the accumulation of data and user insights.[37] In theory, incumbents are well-positioned to leverage their head start to reach a critical mass of users, establish market dominance, improve data quality, and strengthen their user base – all of which potentially creates substantial barriers to entry for new competitors.[38]

However, there are several examples of first-mover disadvantages as well, particularly in immature or emerging markets. One such case was the first online social network, which ultimately shut down due to insufficient internet connectivity among users, resulting in low engagement. It wasn't until later social networks was launched – at a time when internet access had become more widespread – that user uptake and engagement increased significantly, paving the way for other social networks (see chapter 5). Additionally, Google Search was not the first search engine, Chrome was not the first web browser, and Facebook was not the first social network.

Effect on the likelihood of tipping

First-movers can, in theory, establish strong network effects and economies of scale, making it difficult for new entrants to compete. These advantages allow early entrants to establish a user base and benefit from network effects before rivals have the opportunity to gain traction.[39] In this way, first-mover advantages can facilitate market tipping.

Moreover, the first firm to reach a critical mass of users may experience a "snowball effect," where its early lead allows it to extend and reinforce its advantage with minimal additional effort. This early leadership is supported by increasing returns from network effects and switching barriers.

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[36] "*First mover advantages allow early entrants to establish a user base and benefit from network effects before competitors*", Rysman, M. (2009). The economics of two-sided markets. Journal of economic perspectives, 23(3), 125-143.

[37] According to Alexander Guembel & Ulrich Hege (2023), Data, Product Targeting and Competition, working paper "*An initial advantage leads to better data quality and stronger targeting, reinforcing the incumbent's position.*".

[38] "*An initial advantage leads to better data quality and stronger targeting, reinforcing the incumbent's position*", Alexander Guembel & Ulrich Hege (2023), Data, Product Targeting and Competition, working paper.

[39] Belleflamme, P., & Peitz, M. (2015). *Industrial organization: markets and strategies*. Cambridge University Press page 622 further states that "*...firms have a clear interest in trying to build an installed base before their rivals. Doing so, they can benefit from early-mover advantage, which because of the self-reinforcing power of network effects, is likely to lead to a long-standing domination of the market.*" They use a Katz-Shapiro model to show this early-mover advantage in a market with two competing networks.

However, in some markets, first-*leader* advantages – i.e. the advantages held by the first firm to reach critical mass or establish a superior product – may be more important in determining the likelihood of market tipping than simply being the first to enter.

Free services

Free services, sometimes associated with penetration pricing, refer to a strategy in which providers offer their services at no monetary cost to attract a large user base. Instead of paying with money, users typically exchange personal data for access and/or are exposed to advertising while using the service. This approach generates network effects, increase platform value, and increase the user base.

This zero-price strategy is especially common in two-sided markets, where one side of the market pays a price (e.g. advertisers on general search engines), while the other side accesses the service for free (e.g. end-users of a general search engine). The zero-price strategy is also used to solve the "chicken-and-egg" dilemma in two-sided markets[40], where platforms must attract participants on both sides to establish network effects.

Effect on the likelihood of tipping

Offering a service at zero price can drive user adoption fuelling network effects, expanding access to user data, and reducing users' costs from switching from other platforms. In some cases, removing price as a factor may also eliminate one incentive for users to switch to a competing service. Firms with greater financial capacity are typically more able to offer services for free than smaller competitors. Firms with digital ecosystems often have a stronger incentive to offer some or most of its services for free – either to attract users into their broader ecosystem or to reinforce their position in another market.[41]

Offering free services is not, in itself, a direct factor contributing to market tipping, but it can indirectly contribute by reinforcing other factors – most notably, network effects. However, this is generally only likely in markets where the provider expects to recoup its costs (and generate profit) through other means, such as cross-subsidisation, monetisation of user data, or by charging for premium features or advanced functionality over time. In this way, the DCCA considers free services to be a facilitator of one or more of the other market factors that contribute to market tipping.

Product and preference homogeneity

Preference homogeneity refers to the extent to which a group of consumers or users share similar preferences, tastes, or needs for a particular product or service. In markets with high preference homogeneity, most consumers value the same features or attributes in a product, making it easier for one firm or product to satisfy the majority of the market.

Product homogeneity refers to the degree to which products or services offered by different firms in a market are identical – or are perceived as identical – by consumers. Product and preference homogeneity are closely interlinked, and it is rarely obvious which of the two leads to the other. However, depending on the specific market or situation, it may be more feasible

[40] Caillaud, B., & Jullien, B. (2003). Chicken & egg: Competition among intermediation service providers. RAND journal of Economics, 309-328.

[41] Bedre-Defolie, Ö., & Nitsche, R. (2020). When do markets tip? An overview and some insights for policy. *Journal of European Competition Law & Practice, 11(10), 610-622*.

to analyse either preference or product homogeneity. Both aspects are considered in this section.

Conversely, when preferences are heterogeneous – such as when user needs, preferences, and behaviours vary – niche products and market segments may emerge, driving demand for differentiated features and services. Horizontal differentiation is a strategy whereby firms offer unique features, services, or capabilities to appeal to specific user groups. This approach enables the creation of niche market segments and allows multiple firms to coexist by catering to different consumer preferences. By differentiating their offerings, firms can create competitive advantages and enhance market diversity and user choice.

For example, in the social networking market, platforms vary how they allow users to interact with each other and with content creators. Each platform offer different visual styles and functionalities to suit individual preferences. The market for social networking services is further analysed in chapter 5.

Effect on the likelihood of tipping

If competing providers of a product offer a relatively homogenous product, market tipping is more likely than in markets where firms can successfully differentiate their offerings. Likewise, if consumer demand favours homogenous products, tipping is more likely than when consumers prefer a variety of features and product types.

Differentiation in consumer preferences and firm offerings typically prevents a single firm from meeting all user needs through one standardised product or service. Therefore, both product and preference heterogeneity tend to reduce the likelihood of market tipping, as they allow multiple firms to serve distinct user segments, resulting in market segmentation and reducing the risk of a single firm dominating the entire market.[42]

However, when assessing the degree of product and preference heterogeneity, it is important to consider whether the individual product offerings are truly part of the same market, or whether they should be regarded as part of separate markets. In other words, it is important to consider what the relevant market is. This is further discussed in chapter 5.

Low degrees of interoperability

Interoperability refers to the ability of different platforms, systems, or applications to work together. In essence, interoperability can be horizontal or vertical.[43] Horizontal interoperability refers to the ability of products or services with the same (basic) function to work together (e.g. e-mails or telephones), whereas vertical interoperability refers to the ability of different products or services to work together (e.g. wireless headphones and a smartphone). In this section, we focus primarily on horizontal interoperability (whereas the section on ecosystems can be understood as an example of vertical interoperability). One example of a service that is interoperable across providers are e-mail services, where users can send and receive messages across different e-mail providers.

[42] Bedre-Defolie, Ö., & Nitsche, R. (2020). When do markets tip? An overview and some insights for policy. Journal of European Competition Law & Practice, 11(10), 610-622.

[43] Bourreau, M. (2022). DMA Horizontal and Vertical Interoperability Obligations. *Centre on Regulation in Europe (CERRE)*.

Effect on the likelihood of tipping

Interoperability can reduce the likelihood of tipping by limiting lock-in effects and lowering switching barriers. When services are interoperable, users can switch more easily between providers or use multiple platforms simultaneously (multi-homing). It also allows users to interact across platforms without being locked into a specific provider. This can stimulate competition and counter market tipping, by making it easier for new market entrants (smaller market entrants can connect with and "tap into" e.g. the incumbent's existing user network and infrastructure), increasing consumer choice.

In this way, interoperability helps mitigate the "tipping" consequence of strong network effects by allowing users to interact regardless of which service provider others are using (i.e. the network is "shared" or "split" between two or more providers[44]). This enhances user choice and fosters a more competitive market environment. Conversely, low levels of interoperability can limit competition, increase switching costs, and reinforce the market power of incumbents.[45]

However, interoperability can also facilitate market tipping in some cases. For example, if a popular service can be accessed through many different channels (e.g. a general search engine accessible via any web browser), it may actually amplify network effects rather than reduce them. Whether this benefits users depends on the specific market context.

Thus, unlike most market factors discussed in this report, interoperability can either counteract or contribute to tipping, depending on the market and the type of interoperability involved.

Low pace of innovation

Innovation refers to the continuous development and implementation of new technologies, features, services, or business models that attract users, enhance platform value, and challenge incumbents. Innovation plays a critical role in disrupting existing market positions, driving competitive advantage, and shaping market dynamics.[46] By introducing new functionalities and improved services, innovation helps platforms maintain user engagement and adapt in a rapidly changing market environment. Importantly, large incumbents can also be innovators.

Firms can influence their market position by continuously consider how they operate and by innovating – whether through new business models, changes in how users access the service, or pricing strategies.[47]

Innovation can take many forms. In the search engine market, for example, Google's introduction of the PageRank algorithm proved superior to competitors at the time. In the browser market, providers have continued to innovate, for instance, placing greater emphasis on privacy or improving speed and security. These cases are further discussed in chapter 3 and 4.

[44] Ibid.

[45] As an example Gold, A. K. (2010) mentions "*Low levels of operating system inter-compatibility, difficulties in switching from one operating system to another, and the twenty-year dominion of Microsoft Windows in the home and business PC operating system markets make it obvious that switching costs, lock-in, and tipping are distinct possibilities in the market.*", Gold, A. K. (2010), Tipping in Two Sided Software Markets: An Investigation of Asymmetric Cost Differences.

[46] Konkurrence- og Forbrugerstyrelsen (2021), Konkurrencen på markeder med digitale platforme.

[47] See Bedre-Defolie, Ö., & Nitsche, R. (2020). When do markets tip? An overview and some insights for policy. *Journal of European Competition Law & Practice, 11(10), 610-622* page 619.

Effect on the likelihood of tipping

Innovation can reduce the likelihood of tipping. In markets where many firms compete through frequent innovation, it becomes less likely that any single firm will achieve the critical mass of users or data necessary for strong network or data-driven effects to tip the market. If users can easily switch providers in response to innovation, competition remains robust and tipping is less likely. However, if one provider introduces an innovation that is significantly superior to alternatives, the market may shift from a competitive, innovation-driven phase into a tipped state with reduced competition.

Because competition incentivises innovation (as firms innovate to win users or market share)[48], a transformation into a tipped state can lead to a decline in innovation. Once a market has tipped, the winning firm might become less motivated to innovate due to a lack of competitive pressure, and potential challengers may refrain from innovating if they believe the incumbent's network or data advantage is insurmountable.

That said, innovation from a challenger is precisely what can disrupt a tipped market. The challenge lies in innovating without the same access to, for example, user data or behavioural insights. There are several historical examples of innovation disrupting established markets. For instance, the rise of streaming technology allowed users to watch movies and TV shows online, replacing the need for physical DVDs.[49]

In fact, innovation can also be used by dominant firms to maintain their position. A dominant firm with access to superior data or distribution channels may use these advantages to retain users and stifle competitive threats by improving their services and features. This appears to be the case with Google Search, which has continued to evolve and improve its service even after achieving a strong market position (as discussed further in chapter 3).

2.3 The role of regulatory intervention

If the market factors discussed above are present to such an extent that a market is likely to tip – or has already tipped – regulatory intervention (including *ex ante* conduct regulation as well as *ex post* enforcement of competition rules) may be the most effective means to counteract tipping or "untip" a market that has already tipped.

For example, *ex post* competition intervention appears to have played a central role in untipping the web browser market, notably through the unbundling of Internet Explorer from the Windows operating system (see chapter 4).

In addition, the Digital Markets Act (DMA) serves as a prime example of *ex ante* regulation designed to increase contestability in specific digital markets.[50] The DMA imposes obligations on gatekeepers that, to a large extent, address several of the market features which facilitate tipping, such as restrictions on the use of data advantages, bans on certain forms of forced ecosystem uptake practices, or requirements to improve interoperability.

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[48] OECD (2023), "Competition and Innovation: A Theoretical Perspective", *OECD Roundtables on Competition Policy Papers*, No. 294, OECD Publishing, Paris, **https://doi.org/10.1787/4632227c-en**.

[49] **https://medium.com/@igorgrochu/the-rise-and-fall-of-blockbuster-a-detailed-account-11324a49acd9**

[50] The DMA also aims at making platform markets fair (in addition to contestable), which in the DCCA's view can be understood as ensuring that insofar a platform market does not untip (i.e. because many of the market factors that facilitate tipping are present and strong), the "market winning" firm cannot unfairly utilise its position to extract rents or gain advantages in adjacent markets, for example.

The DMA is not aimed solely at markets that have already tipped, but a defined group of platform services provided by large enough firms (gatekeepers) that act as intermediaries between business users and end-users. In this context, a tipped market represents the most extreme example of such a market.

Effect on the likelihood of tipping

As a general point, regulatory intervention (whether *ex ante* or *ex post*) can help mitigate market tipping or reduce the negative effects of tipping on end-users.

For regulators, it may be useful to consider the market features outlined in the previous section when assessing whether to intervene to prevent or counteract market tipping. However, it is equally important to consider whether tipping has led, or is likely to lead, to negative market outcomes – particularly whether consumers have been harmed.

Just as competition law does not prohibit market dominance but only the abuse of it, regulatory intervention should not be based solely on the fact that a market has tipped or appears likely to tip. Intervention should instead be guided by evidence of harm or significant barriers to contestability resulting from tipping.

2.4 Distinguishing tipped markets from natural monopolies

Building on the preceding examination of market tipping, it is reasonable to consider how a tipped market differs from a natural monopoly – particularly as both may result in a market equilibrium where a single firm serves the entire market demand.

A natural monopoly arises in industries where a single firm can supply goods or services to an entire market more efficiently and at a lower cost than multiple competing firms could.[51] This is typically due to structural cost advantages and market characteristics that discourage entry.

Natural monopolies exhibit the following characteristics:

» High fixed costs: Significant investments are required for infrastructure, making it inefficient for multiple firms to build duplicate facilities.
» Economies of scale: The average cost of production declines as output increases, giving larger firms a cost advantage.
» Market demand: Total market demand is often insufficient to support more than one firm operating profitably.

A classic example of a natural monopoly is water distribution. To supply water, a firm must invest in an extensive network of pipes. If two or more firms competed in this space, each would incur the fixed costs of constructing their own pipe networks. Consequently, the average total cost of supplying water to end-users is lowest when a single firm serves the entire market.[52]

Natural monopolies typically do not face competitive pressure from potential new entrants in the market. In general, a firm struggles to maintain a monopoly position without ownership of

[51] Baumol, W. J. (1977). On the proper cost tests for natural monopoly in a multiproduct industry. *The American economic review, 67*(5), 809-822.
[52] Mankiw, N. G., & Taylor, M. P. (2020). Economics. Cengage Learning EMEA.

a key resource, as the prospect of monopoly profits attracts new entrants, increasing competition. However, in the case of a natural monopoly, market entry is unattractive because new entrants know they cannot achieve the same cost efficiency as the incumbent, due to the high fixed costs, economies of scale and limited demand.[53]

A tipped market, by contrast, is characterised by strong network effects, often in combination with other factors, which lead to a situation, where a single provider accumulates a critical mass of users.[54] Once this threshold is reached, the market tips in favour of that dominant firm, creating a 'snowball effect' where its dominance becomes self-reinforcing and very difficult for competitors to challenge. Tipped markets do not typically "untip" unless there is an exogenous disruption, such as a technological breakthrough, a shift in consumer preferences, or regulatory intervention or an endogenous shock.

Box 2.1
Key differences

In summary, the difference between natural monopolies and tipped markets are:

Drivers of dominance
» Natural monopolies are driven by high fixed costs and economies of scale.
» Tipped markets are primarily driven by network effects.

Typical sectors
» Natural monopolies are common in utility and infrastructure-heavy industries.
» Tipped markets are often found in technology and platform sectors, where user interaction is central.

Path to dominance
» In natural monopolies, efficiency and cost advantages lead to a single firm prevailing.
» In tipped markets, user growth and network effects drive dominance once a critical mass is reached.

Persistence of dominance
» A natural monopoly is unlikely to stop being one unless technological change makes the business no longer relevant.
» A tipped market can "untip" due to exogenous shocks such as innovation, regulation, or changing user behaviour – or endogenous shocks.

Welfare implications
» When effectively regulated, natural monopolies can operate efficiently and deliver broad public benefits with limited harm to overall welfare.
» Tipped markets, on the other hand, are more difficult to regulate due to their dynamic nature. Firms can rapidly gain power through network effects and data-driven learning – factors that are less stable than the cost structures underpinning natural monopolies.

[53] Laffont, J. J., & Tirole, J. (1993). *A theory of incentives in procurement and regulation*. MIT press and Mankiw, N. G., & Taylor, M. P. (2020). Economics. Cengage Learning EMEA.

[54] Evans, D. S., & Schmalensee, R. (2016) describe how digital platforms differ from natural monopolies in traditional markets, and how digital platforms achieve a monopoly-like position through network effects and scale. see Evans, D. S., & Schmalensee, R. (2016) *Matchmakers: The new economics of multisided platforms.* Harvard Business Review Press.

Chapter 3
The general online search engine market

3.1 Introduction

The market for general online search engines is frequently cited in the literature as a prime example of a tipped market.[55] Indeed, among the markets most likely to have tipped, Google Search stands out, having maintained a user share above 90 pct. This makes it a relevant case for evaluating the market features discussed in chapter 2.

3.2 Product description

A general search engine allows users to search the internet using queries, returning results that aim to match the user's intent.[56] Unlike specialised search engines, which operate within a narrower scope (e.g. price comparison sites or internal site searches), general search engines index and search across a vast portion of the web.[57]

Google Search uses a complex system to index and rank billions of web pages, with algorithms considering factors such as meaning, relevance, quality, usability, and context. The weight assigned to each factor varies depending on the nature of the query.

Google Search is free for end-users and monetised primarily through advertising. Google displays ads alongside the organic search results for certain search queries. When users search for terms related to certain keywords, relevant ads are shown, typically at the top of the search result page.[58] The ads are marked as such and are seamlessly integrated into the search result page, and Google's algorithms aim to ensure that the ads shown are relevant to the search query.[59]

Most other general search engines, such as Microsoft's Bing, operate in a fundamentally similar way, including the use of web crawlers, indexing, ranking, and combining organic and ad-based search results.[60]

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[55] See for example Bedre-Defolie, Ö., & Nitsche, R. (2020) When do markets tip? Page 1 mentions that "*At least in Europe, general search markets have tipped for Google*".

[56] The EU Commission has concluded that: *"... general search services belong to a different product market than other online services such as content sites, specialized search services and social networks"* Case AT.40099 *Google Android*, Commission decision of 18 July 2018, recital 330. Further, see United States v. Google LLC, No. 1:20-cv-3010 (APM), p. 14 (D.D.C. Aug. 5, 2024).

[57] Case AT.40099 *Google Android*, Commission decision of 18 July 2018, recital 334.

[58] **https://support.google.com/google-ads/answer/6227565?hl=da.**

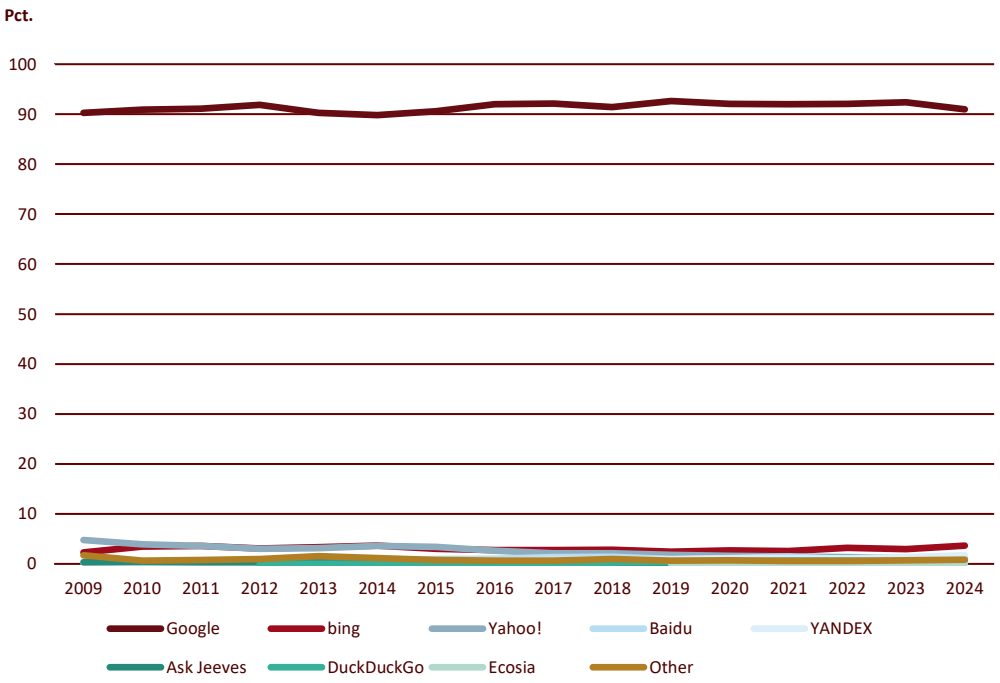
[59] **https://support.google.com/adsense/answer/9000515?hl=en.**

[60] See for example **https://www.lumar.io/learn/seo/search-engines/how-do-search-engines-work/** for a general introduction of how general online search engines work.

3.3 Market description

The general search engine market is highly concentrated, with Google Search holding a 91 pct. user share as of 2024, a position it has maintained since at least 2009 cf. Figure 3.1.[61] Alternatives exist, such as Microsoft Bing, as well as smaller niche search engines focused on privacy or sustainability.

Figure 3.1 **Global user shares of general online search engines, 2009-2024**



Source: Statcounter GS.[62]

Globally, billions of search queries take place daily. Most search engines generate revenue through advertising, often using user data and search history to deliver targeted ads alongside search results.

[61] **https://gs.statcounter.com/search-engine-market-share#yearly-2009-2025** and **https://www.statista.com/statistics/1381664/worldwide-all-devices-market-share-of-search-engines/**. For information on how user shares are calculated see: **https://gs.statcounter.com/faq#methodology**.

[62] Accessible at **https://gs.statcounter.com/search-engine-market-share%22%20/l%20%22yearly-2009-2025**.

There are significant barriers to entry in this market, making it difficult for new competitors to challenge an incumbent like Google. These include economies of scale, network effects, advanced technology and algorithms, and a well-established advertising ecosystem.[63]

The European Commission has recognised a distinct market for general search services, noting that it is national in scope (see Case AT.40099, *Google Android*, recital 422).[64] Similarly, the U.S. District Court for the District of Columbia recently ruled that general search engines constitute a separate product market and that other sources of query information are not substitutes.[65]

Box 3.1
Market players

The following seven search engines were the most popular during the third quarter 2024, according to search engine user share data by StatcounterGS[66]:

- **Google** is the dominant player in the market, holding approximately 90 pct. of the user share globally.[67]
- **Bing**, owned by Microsoft, is the second-largest player but holds a much smaller share compared to Google (only about 4 pct. globally). "*Bing is Google's largest general search competitor today. It is the only rival to Google that crawls the web and generates its own search results. The next two largest search engines, Yahoo and DDG, syndicate their search results from Bing*".[68] Bing is relatively more popular in certain regions (China: 30 pct. and USA: 7 pct.)[69] and is integrated into Microsoft products like Windows and Office.
- **Yahoo!** was once a more significant player but has lost considerable user share over time. Today, Yahoo holds about 1 pct. of the user share globally and uses Bing's technology to power its searches.
- **DuckDuckGo** is a smaller player but has grown in popularity due to its focus on user privacy. It currently have under 1 pct. of the user share globally. Unlike most other search engines, DuckDuckGo does not track users' search activities, which appeals to users concerned about online privacy.[70] It generates revenue from private ads based on the search results page being viewed, rather than tracking-based algorithms.[71]
- **Yandex** is the leading search engine in Russia, with about 60 pct. user share on the Russian market. Yandex also offers a range of other internet-related products and services, including mapping, email, and a web browser.[72] However, Yandex only holds approximately 2 pct. of the user share globally.
- **Baidu** is the leading search engine in China, with approximately 50 pct. user share in the Chinese market. Baidu offers users a range of features including maps, news, video, an encyclopedia, anti-virus software, and internet TV. The company generates revenue through

[63] In 2017 The European Commission stated about Google that: "*There are also high barriers to entry in these markets, in part because of network effects: the more consumers use a search engine, the more attractive it becomes to advertisers.*" **https://ec.europa.eu/commission/presscorner/detail/en/IP_17_1784**.

[64] The Commission has concluded that Google holds a dominant position in each national market for general search services in the EAA and have been since at least 2011. There are markets where Google Search is not the dominant general search engine, e.g. on the Chinese and Russian markets, where local search engines are the dominant players.

[65] United States v. Google LLC, No. 1:20-cv-3010 (APM), p. 140 (D.D.C. Aug. 5, 2024).

[66] **https://gs.statcounter.com/search-engine-market-share#quarterly-202403-202403-bar**.

[67] "*Perhaps the best example of Google's brand is that the public uses the term "Google" interchangeably with internet search.*", United States v. Google LLC, No. 1:20-cv-3010 (APM), p. 48 (D.D.C. Aug. 5, 2024).

[68] United States v. Google LLC, No. 1:20-cv-3010 (APM), p. 13 (D.D.C. Aug. 5, 2024).

[69] **https://blog.webcertain.com/8-markets-where-bing-has-over-5-of-the-search-engine-market-share/02/08/2023/**.

[70] **https://www.whitepress.com/en/knowledge-base/2064/search-engines.**

[71] **https://duckduckgo.com/duckduckgo-help-pages/company/how-duckduckgo-makes-money/.**

[72] **https://www.statista.com/topics/10280/yandex/#topicOverview.**

advertising, using a system similar to Google's, where advertisers bid on keywords to display their ads.[73] However, Baidu holds under 1 pct. of the user share globally.[74]

» **Ecosia** is a search engine that uses its ad revenue to fund tree-planting projects around the world. Ecosia's search results are powered by Bing. Ecosia combines Bing's search technology with its own algorithms and enhancements, and places ads that generate revenue to fund tree-planting projects.[75]

3.4 Market development and tipping process

The first search engines

The first search engine, Archie, was created in 1990. Rather than indexing web content, Archie indexed file names. In the years that followed, search engines such as Yahoo!, AltaVista, and Lycos were launched, offering basic keyword-based search functionalities and displaying website links as search results. These early search engines relied on relatively simple algorithms to index and rank websites, often resulting in cluttered and irrelevant results for users.

During this period, search engines Ask Jeeves (now Ask.com) and MSN Search (now Bing) also entered the market, attempting to differentiate themselves through features such as human-curated answers and more user-friendly interfaces. However, none of these engines fully succeeded in meeting users' growing demand for more accurate and relevant search results.

Google's entry and growth

Google was founded in 1998 and introduced the PageRank algorithm,[76] which revolutionised online search. Unlike earlier approaches, PageRank ranked web pages based on both content and the number of inbound links. According to Google: "*the underlying assumption is that more important websites are likely to receive more links from other websites.*"[77] This approach significantly improved the relevance and quality of search results and resonated with users, making Google a preferred choice among users.

By 2000, Google had already become the largest search engine, indexing over 1 billion web pages. Its user base grew rapidly after it became the default search engine for Yahoo!, one of the largest internet portals at the time.[78]

While precise data on search engine user shares for the years prior to 2009 is hard to come by, there is broad consensus that Google quickly became the most widely used search engine worldwide. By 2009, Google accounted for over 90 pct. of global search queries—a share that has remained consistent to this day (see Figure 3.1). In other words, Google's user share is now 21 times larger than that of its nearest competitor, Microsoft Bing.

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[73] **https://www.investopedia.com/terms/b/baidu.asp.**

[74] One of the reasons why Baidu's global user share is so small, despite China's large population, might be that, in addition to the Great Firewall, there are restrictions on mobile usage in China: **https://24tech.dk/nyheder/mennesket-og-teknologi/kinavil-begraense-boerns-daglige-mobilforbrug-til-maks-2-timer/ (in Danish)**.

[75] **https://www.ecosia.org/.**

[76] **https://www.google.com/search/howsearchworks/our-history/.**

[77] **https://web.archive.org/web/20111104131332/https://www.google.com/competition/howgooglesearchworks.html**.

[78] See **https://www.google.com/search/howsearchworks/our-history/** and **https://www.theguardian.com/technology/2000/jul/02/searchengines.columnists**.

3.5 Assessment of presence of market tipping factors

Network effects
There are strong indirect network effects in the search engine market.[79] More search users attract more advertisers, increasing revenue for the search engine provider. While there may be a negative indirect effect – i.e. more ads potentially discouraging search users – this appears much weaker than the positive effect attracting advertisers.

There are also direct network effects, albeit less obvious, since users do not interact with each other directly when searching the internet. Google Search, for example, allows users to post reviews of restaurants and hotels, which directly benefits other users. If Google Maps is considered part of Google Search, users can share their personal maps with other users (where they have marked out recommended restaurants and museums).

However, the most significant "direct" network advantage stems from Google's much larger user base, which gives it access to more – and more diverse – search queries and click behaviour, feeding into its data advantage (discussed below). On the advertiser side, direct network effects may also occur if the presence of one advertiser incentivises others to advertise on the same platform.[80]

Switching barriers
There are no direct financial switching costs for search users. However, there are significant switching barriers in terms of user inertia due to default settings and familiarity with the incumbent search engine, search history and personalisation.[81] Furthermore, switching may temporarily degrade search quality due to the absence of tailored results or search history.

Single-homing
On the search-side of the market users tend to single-home, e.g. due to a strong habitual effect.[82] While it is technically possible to switch or alternate between search engines (multi-homing), it is only possible to have one *default* search engine, and the default setting has

[79] In 2017, The European Commission stated about Google that: "*There are also high barriers to entry in these markets, in part because of network effects: the more consumers use a search engine, the more attractive it becomes to advertisers.*" **https://ec.europa.eu/commission/presscorner/detail/en/IP_17_1784**. The EU Commission also noted in the Google Android case that: "M*onetization only occurs on the online search advertising side of the platform, therefore advertisers indirectly fund the general search services offered to users. The level of advertising revenue that a general search platform can obtain is related to the number of users of its general search service: the higher the number of users of a general search service, the wider the audience advertisers can reach and therefore the more the online search advertising side of the platform will appeal to advertisers.*" Case AT 40099, Google Android, pt. 328.

[80] The DCCA has shown that Danish advertisers spend significant amounts on advertising for search queries for their own firm or brand name, in part to ensure that the top search result (an ad result) goes to their website and not to potential competitors who are able to advertise on competitors' firm or brand name, cf. DCCA (2023), Virksomheders selvannoncering på generelle online søgemaskiner (in Danish).

[81] The US court states "*That users overwhelming use Google through preloaded search access points is explained in part by default bias, or the "power of defaults." The field of behavioral economics teaches that a consumer's choice can be heavily influenced by how it is presented (describing the concept of "choice architecture"). The consensus in the field is that "defaults have a powerful impact on consumer decisions*.", United States v. Google LLC, No. 1:20-cv-3010 (APM), p. 26 (D.D.C. Aug. 5, 2024).

[82] The EU Commission noted that: *"Only a minority of users in the EEA that use Google's general search service as their main general search service actually use other general search services. This is confirmed by a number of factors."* Case AT.40099 *Google Android*, Commission decision of 18 July 2018, recital 709.

proven to play a crucial role in user choice.[83] This is partly due to status quo bias, where users rarely change defaults, even if it's possible to do so across different browsers or devices.[84]

Following the European Commission's 2018 Android decision, Google implemented a choice screen for general search engines on new Android devices in the EU (2019).[85] The choice screen appears during the initial setup of the device and present the user with a randomised list of eligible general search engines. However, this has not noticeably affected Google Search's user share.

On the advertiser side, there is little evidence of single-homing when looking at their overall spend on (digital) advertising activity. Although some firms may focus their advertising budget on one platform, this appears to be driven by strategic choices rather than high costs of multi-homing. Search advertising is generally scalable and easy to start, pause, or stop.[86]

Scale benefits

Google benefits from significant scale effects – in terms of user base, capital, data collection (including access to unique search queries, see below), comprehensive indexing, distribution channels and global infrastructure.[87] In June 2023, Google Search had an estimated 8.2 billion unique visitors, compared to Bing's 660 million.[88] This scale enables Google to test and deploy new features more quickly.[89] The marginal cost of providing search services to additional users is near zero, meaning that a larger search engine provider can afford to undertake more costly improvement activities than smaller competitors.

Data advantages

Data advantages are highly relevant in the market, and Google Search benefits from its vast user base in this regard. More users lead to more search queries (both in quantity as well as more unique ("long-tail") queries[90] and clicks which leads to more user behaviour data and

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[83] The EU Commission noted that: *"The reason why pre-installation, like default setting or premium placement, can increase significantly on a lasting basis the usage of the service provided by an app is that users that find apps pre-installed and presented to them on their smart mobile devices are likely to "stick" to those apps. HP described the creation of a "status quo bias" in the form of premium placement and default setting as follows: "Premium placement and default settings give applications and services located in those positions the advantage of being the first things users see when they start to interact with their device. Users are more likely to try these applications/services based on their prominent visibility and once they are using them, they usually continue to do so. It is an easy way to obtain new users and deliver almost automatic stickiness for an application or service.""* Case AT.40099 *Google Android*, Commission decision of 18 July 2018, recital 781. Further the US court has noted that "*The default is extremely valuable real estate. Because many users simply stick to searching with the default, Google receives billions of queries every day through those access points.*", United States v. Google LLC, No. 1:20-cv-3010 (APM), p. 2 (D.D.C. Aug. 5, 2024).

[84] The EU Commission notes that; *"In order to overcome the status quo bias and see users looking for alternatives, service providers need to convince users that their service is significantly better than the alternative that is already pre-installed, premium placed or set as default"* Case AT.40099 *Google Android*, Commission decision of 18 July 2018, recital 782.

[85] **https://www.android.com/choicescreen/.**

[86] Advertisers use a search engine management tool, or SEM tool, which enables advertisers to manage advertising campaigns across different online platforms, including GSEs, SVPs, and social media platforms. SEM tools are helpful because they take the application programming interface from native tools and apply them in ways that facilitate management of multi-platform advertising campaigns all in one place, United States v. Google LLC, No. 1:20-cv-3010 (APM), p. 98-99 (D.D.C. Aug. 5, 2024).

[87] *"Greater query volume means more user data, or "scale." As the most widely used GSE in the United States, Google receives nine times more queries each day than all of its rivals combined across all devices.",* United States v. Google LLC, No. 1:20-cv-3010 (APM), p. 34 (D.D.C. Aug. 5, 2024).

[88] **https://www.semrush.com/blog/bing-vs-google/.**

[89] An analysis made by Google has shown that *"if Apple could sustain a business with only one third of Google's engineering and product management costs, it still would cost Apple $7 billion annually. Seven billion dollars was equal to more than 40% of Apple's total research and development expenditure in 2019"*, United States v. Google LLC, No. 1:20-cv-3010 (APM), p. 22 (D.D.C. Aug. 5, 2024).

[90] The US court has noted that 93 pct. of unique search queries were only seen by Google, compared to 4.8 pct. unique phrases only seen by Bing, see **https://spreadprivacy.com/creating-enduring-competition-in-the-search-market/**.

improved search algorithms. This in turn improves search results and overall user experience further improving results and retaining users.[91] This data-enabled learning loop indeed is one of the – if not the most – central market features and core drivers that has led to and maintained the tipped state of the market. To date, no competitor has successfully challenged this advantage.

In search engine markets, where experiments and tests[92] are common in a trial-and-error fashion, having a large user network can also be understood as allowing the firm to err more often than competitors who do not have access to the same user numbers and data. Google, with 1 billion daily active users, can test new features and evaluate performance far more efficiently than Bing, which has approximately 100 million daily users.[93]

Ecosystem
Google's ecosystem of digital services has created extensive reach, a strong data advantage, and contributes to user lock-in, as Google can access data not only from users' search activity but also from various other online activities. This data is used to improve search results and enhance the overall user experience.[94] At the same time, it strengthens Google's ability to personalise search ads, further increasing the platform's attractiveness to advertisers.

First-mover advantages
Although Google was not the first search engine, it effectively capitalised on late-mover advantages by offering a superior product through its PageRank algorithm, significantly improving search relevance.

Free services
Google Search (and other search engines) is free for search users, while advertisers pay to appear in relevant queries. Advertising on Google Search costs vary depending on relevance and competition and are set via automated, real-time bidding via Google's algorithms. While users do not pay directly, it is often said that they "pay" with their personal data.[95] Conversely, advertisers subsidise the free service.

Product and preference homogeneity
There is limited product differentiation, although some niche search engines offer features such as enhanced privacy or sustainability (e.g. tree-planting initiatives).

Judging by market data, these niche providers each hold a user share of approximately 1 pct., suggesting limited preference heterogeneity. However, it remains unclear whether this reflects actual user preferences or simply the inability of niche search engines to match Google's search quality. As a result, it is difficult to assess to what extent users genuinely prefer, for

[91] The US court noted that "*Because many users simply stick to searching with the default, Google receives billions of queries every day through those access points. Google derives extraordinary volumes of user data from such searches. It then uses that information to improve search quality. Google so values such data that, absent a user-initiated change, it stores 18 months-worth of a user's search history and activity.*", United States v. Google LLC, No. 1:20-cv-3010 (APM), p. 2 (D.D.C. Aug. 5, 2024).. Further, The EU Commission noted that: "*The data which users agree to allow a general search service to store and re-use is of value to the provider of the general search service as it is used to improve the relevance of the search service and to show more relevant advertising.*" Case AT.40099 *Google Android*, Commission decision of 18 July 2018, recital 327.

[92] Gallo, A. (2017), A Refresher on A/B Testing, Harvard Business Review.

[93] Theuring, J. (2024), Bing vs Google: Search Engine Comparison 2024.

[94] United States v. Google LLC, No. 1:20-cv-3010 (APM), p. 2 (D.D.C. Aug. 5, 2024).

[95] The EU Commission noted that: "… even though users do not pay a monetary consideration for the use of general search services, they contribute to the monetization of the service by providing data with each query." Case AT.40099 *Google Android*, Commission decision of 18 July 2018, recital 326.

example, stronger privacy protections but choose not to switch due to the inferior performance or relevance of search results offered by alternative providers.

Interoperability
Google Search and most other search engines are interoperable – they can be accessed and used regardless of e.g. which web browser, device or operating system one uses.[96]

Innovation
There has been substantial innovation in the search engine market, perhaps primarily by the incumbent Google. However, no innovative efforts by challenging search engine providers appear to have significantly disrupted Google's strong market position. Expectations regarding the potential of AI to substantially transform the search engine market remain mixed and uncertain.

Regulation and anti-competitive practices
Despite the presence of strong tipping-related factors and continued innovation by Google, evidence suggests that Google may also have sustained its dominant position through anti-competitive practices, several of which have been the focus of competition authority investigations and legal actions.[97] For example, the 2024 judgement from the U.S. particularly focus on how Google's ability to secure Google Search as the default search engine on devices has given Google an unlawful competitive advantage.

3.6 Conclusion: A tipped market

There are strong indications that the market for general online search engines has tipped in Google's favour. The introduction of the PageRank algorithm in 1998 proved superior to competing indexing algorithms. Google Search has consisently handled over 90 pct. of global search queries for at least 15 years, and no event during this period appears to have significantly disrupted Google's market position, not even temporarily.

Two interrelated market factors in particular seem to have driven this tipped market state: data-enabled learning and network effects, with the data advantages appearing to be the factor of most importance for the tipped market state. In addition, economies of scale as well as Google's ecosystem of digital services also play important roles, though perhaps not to the same extent as the two aforementioned market factors.

Fundamentally, it appears that Google's access to substantially larger volumes of search and click data as well as far greater number of search query entries compared to competing search engine providers, has enabled Google to consistently outperform and stay ahead of competitors – particularly in its ability to handle unique or rare search queries. Given this data advantage, users may be right to view Google Search as the best search engine.

[96] The EU Commission has noted following regarding general search services on PCs and smart mobile devices: "… from a supply-side perspective, while the user interface is different, the underlying technology is the same. The infrastructure and volume of data necessary to execute the general search service are also the same irrespective of the point of access." Case AT.40099 *Google Android*, Commission decision of 18 July 2018, recital 355. Further, The EU Commission has noted following regarding general search services on different smart mobile Oss: "… Moreover, the cost of developing an app to run on a different smart mobile OS is small compared to the overall investment required to develop a general search service." Case AT.40099 *Google Android*, Commission decision of 18 July 2018, recital 360.

[97] See for example The EU Commission Google Shopping Case (C-48/22 P), the EU Commission Google Android Case (AT.40099), the EU Commission Google AdSense Case (AT.40411), and The US DOJ case regarding Google Search **https://www.justice.gov/opa/pr/justice-department-statements-us-district-court-district-columbias-decision-us-v-google**.

While network effects are fundamental for the market tipping process, they do not arise from direct user-to-user interaction. Rather, they stem from the fact that a dominant user base enables Google to continuously develop, test, and optimise its search and display algorithms at a scale unmatched by competitors.

Moreover, the indirect network effects – where a larger user base attracts more advertisers – mean that Google generates significantly higher advertising revenues than its rivals. This revenue can be reinvested into further improving the service or funding other business activities, reinforcing Google's competitive edge.

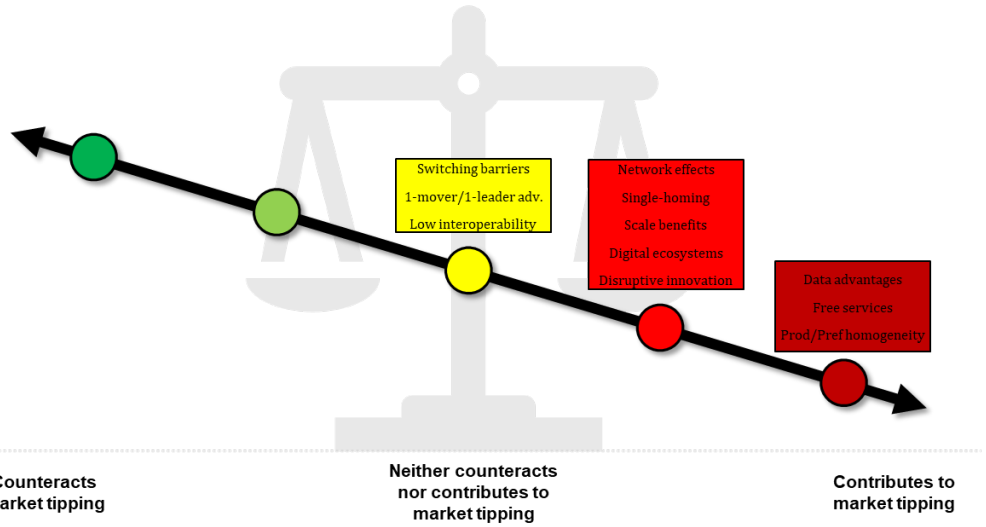
Economies of scale are another key factor, not only in relation to data volumes and network effects but also because operating a high-quality search engine requires significant computing power and infrastructure, which involve high fixed costs but relatively low variable costs.

While Google Search may still have been the largest search engine without its broader digital ecosystem, it is likely that its user and advertising market shares would have been lower. Google's widespread distribution channels – including its Chrome browser, Android operating system, and partnerships with third parties – have further cemented its position. These practices have also drawn the attention of competition authorities.

Google may also have sustained its dominant position through anti-competitive practices, several of which have been the focus of competition authority investigations and legal actions. While it is perhaps unrealistic to assume that, in the absence of such practices, the market would be characterised by several equally strong competitors, these actions have nonetheless restricted competition and reduced user choice.

Figure 3.2 summarises and illustrates the presence and strength of the market tipping factors in the market for general online search engines.

Figure 3.2 **Summary of market tipping factors in the market for general online search engines**



Source: DCCA analysis.

Chapter 4
The browser market

4.1 Introduction

The web browser market offers an illustrative example of how the identified "tipping factors" can interact as a market moves from a tipped state in favour of one actor, to untipping, and later tipping again into a stable duopoly. The market exhibits many of the characteristics typical of a tipped market, which raises a key question: why has this market not remained tipped, unlike, for instance, the general search engine market? Are there inherent features of the web browser market that make tipping less likely or less stable, or is the explanation better found in the actions (or inaction) of individual market players or external factors?

4.2 Product description

Web browsers are software applications that allow users to access and browse the World Wide Web.[98] They enable users to view websites, interact with online content, and navigate between web pages. Browsers act as intermediaries between users and the internet, translating web code into visual interactive elements that users can understand and use.[99]

The web browser market can be considered as a two-sided market, connecting two groups of users: end-users (people who browse the web) and content providers (website developers). Users are attracted to web browsers offering better quality in terms of performance, speed, design, privacy and security, and range of content (which includes not just websites, but also browser add-ons, extensions, and services such as integrated search engines).[100]

However, users tend to display significant "default bias". A user's choice of web browser highly depends which one is pre-installed or set as the default, typically determined by the device's operating system.

Web browsers are also closely tied to operating systems in terms of design and optimisation, which affects performance.[101] While Chrome, Firefox, Opera, and Edge are compatible across all mainstream operating systems and devices, Safari is exclusive to Apple's operating systems. Safari was once available for Windows but that availability was discontinued in 2012.[102]

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[98] Case AT.*39530 Microsoft (tying)*, Commission decision of 16 December 2009, recital 19.

[99] Case AT.*39530 Microsoft (tying)*, Commission decision of 16 December 2009, recital 19. Further, see **https://www.businessresearchinsights.com/market-reports/internet-browsers-market-107290**.

[100] **https://browser.au/articles/the-ultimate-guide-to-choosing-the-right-web-browser/.**

[101] **https://www.bbc.co.uk/bitesize/guides/zws982p/revision/2.**

[102] **www.apple.com/newsroom/2007/06/11Apple-Introduces-Safari-for-Windows/** and **www.theverge.com/2012/7/25/3186086/safari-for-windows-references-removed**. Apple never issued an official announcement about this, but the reasons could be, first, that it did not increase Safari's user share as much as Apple had hoped. Second, Google Chrome was experiencing rapid growth at the time and was becoming the most popular browser. Consequently, it might not have been worthwhile for Apple to maintain Safari's compatibility with the Windows operating system. When Apple

All modern web browsers are built on a browser engine (also known as a rendering engine), which is a core component responsible for interpreting and displaying web content.[103] It converts code written in web languages (such as HTML, CSS, and JavaScript) into visual and interactive elements. Amongst popular browser engines are Blink (based on Chromium), WebKit and Gecko.[104]

While web browsers are typically provided for free to download and use, they are not non-commercial products. The underlying business models vary by provider but often involve indirect revenue generation. One typical source of revenue is advertising royalties, for instance, via search engine partnerships. For example, Google pays Apple double-digit billions of U.S. dollars annually to remain the default search engine on the Safari browser.[105]

Perhaps even more valuable than advertising royalties is the user data collected via browsers. By tracking and processing users' internet activity, browser providers can build digital user profiles, which can be monetised through targeted advertising or other commercial services.[106]

4.3 Market description

The web browser market is characterised by one distinct market leader (Google Chrome), a clear second-largest player (Apple's Safari), a growing third player (Microsoft Edge), and a range of niche browsers catering to specific user needs such as privacy, customisation, developer tools etc. cf. Figure 4.1.[107]

discontinued support for Safari on Windows, users of Safari on Windows OS had to switch browsers, and many may have chosen Google Chrome instead.

[103] **https://techterms.com/definition/browser_engine/** and **https://assets.publishing.service.gov.uk/media/61b86737e90e07043c35f5be/Appendix_F_-_Understanding_the_role_of_browser_engines.pdf.**

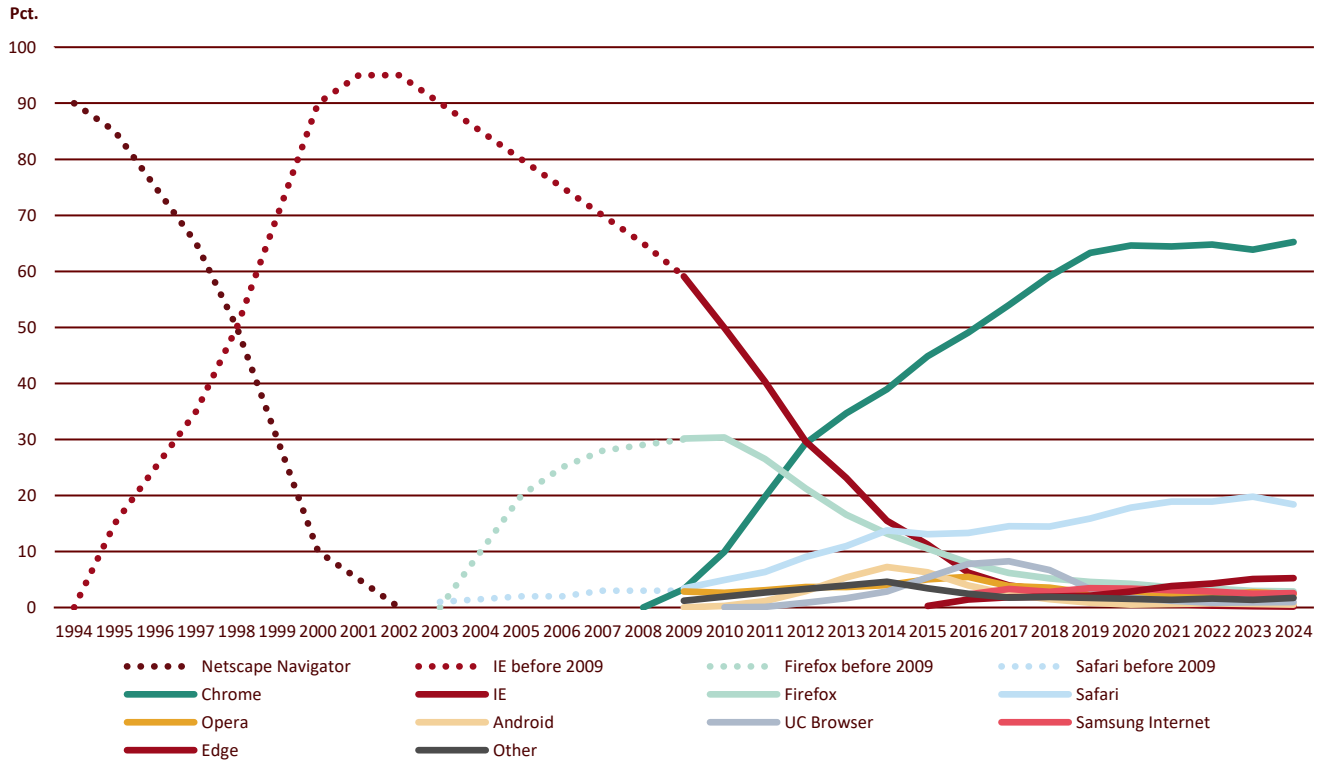
[104] "*Now that there are essentially only 3 major JavaScript engines and Chromium will gain an even bigger market share from 65% plus whatever they are absorbing from Edge and Internet Explorer which are about 15%, we'll see web developers build their sites to work best on the most popular browser engine.*" **https://medium.com/@jonbiro/browser-engines-chromium-v8-blink-gecko-webkit-98d6b0490968.**

[105] **https://www.bloomberg.com/news/articles/2024-05-01/google-s-payments-to-apple-reached-20-billion-in-2022-cue-says.**

[106] **https://www.investopedia.com/articles/investing/041315/how-mozilla-firefox-and-google-chrome-make-money.asp**.

[107] **https://medium.com/@abbas143/list-of-100-web-browsers-across-various-platforms-df43ab1b0ab6.**

Figure 4.1 **Global user shares for web browsers, 1994-2024**



Note: Information on user shares before the year of 2009 is hard to come by. Different sources of data indicate that Netscape in 1994 had a user share of 80-90 pct. The following years Netscape's user share declined and was surpassed by Internet Explorer approximately around 1998-1999. According to various sources Internet Explorer peaked around the years of 2000-2004 with user shares of 80-95 pct. Following its decline from 2004 and onwards.

Note 2: Break in time series at 2009.

Source: Statcounter GS (2009 and onwards) + various sources for data from before 2009.

The European Commission, in its decision of 16 December 2009 in Case AT.39530 – *Microsoft (tying)* defined the market for web browsers for client PC operating systems as a distinct product market.[108]

However, since then, mobile browsing has become increasingly important. In the first quarter of 2024, 96 pct. of global internet users accessed the internet via a mobile phone, whereas 62 pct. also used a laptop or desktop computer, and 28 pct. accessed it via a tablet.[109] The rise in

[108] Case AT.*39530 Microsoft (tying)*, Commission decision of 16 December 2009, recital 22. The Commission further stated in recitel 23 that the relevant geographic market for web browsers for client PC operating systems is world-wide.

[109] Statista, Share of users worldwide accessing the internet in 1st quarter 2024, by device: **https://www.statista.com/statistics/1289755/internet-access-by-device-worldwide/**.

mobile usage has browser providers to prioritise speed, usability, and battery efficiency on mobile devices.[110]

Box 4.1
Market players

- **Netscape Navigator** was the first widely-used web browsers, launched in 1994. It played a pivotal role in popularising the internet during the early web era. Known for its user-friendly interface and innovative features, it quickly became the dominant browser in the mid-1990s. By the early 2000s, Netscape had largely disappeared from the market, but its legacy lived on through the development of Mozilla Firefox, which was based on Netscape's open-source code.[111]
- **Internet Explorer (IE)** is a web browser developed by Microsoft and launched in 1995. It quickly became the dominant browser in the late 1990s and early 2000s, largely due to its integration with the Windows operating system.
- **Microsoft Edge** replaced Internet Explorer with the release of Windows 10 in 2015 and is the default browser for Windows OS.[112]
- **Mozilla** launched **Firefox** in November 2004 as an alternative to Microsoft's Internet Explorer browser.[113] It briefly surpassed Internet Explorer as the most popular browser in 2009. Mozilla Firefox is known for its focus on privacy protection and open-source principles.[114]
- **Google Chrome** was launched in 2008. Chrome quickly became the largest player, with over surpassing both Internet Explorer and Firefox around 2012. Its popularity stems from its fast performance, minimalist design, extensive library of extensions,[115] and deep integration with Google's ecosystem, including Gmail, Google Docs, and Google Drive.
- **Safari** is the default browser for Apple's macOS, iOS and iPadOS devices (i.e. MacBooks, iPhones and iPads). It was launched in January 2003 for macOS (thus, the Safari browser is "older" than the iPhone and the iPod Touch, which were launched in 2007). Today, Safari is particularly popular as a mobile browser due to its deep integration with iPhone and iPad devices. *PcMag* sums up its "Which Browser Is Best for 2024?" review of Safari by stating "*If you use an iPhone and a Mac, Safari integration makes a lot of sense, since Apple's Handoff feature lets you continue your browsing session between devices.*"[116]
- **Opera** is a relatively small player in the market. Opera differentiates itself through features such as a built-in VPN, ad-blocker, and cryptocurrency wallet.[117] It is popular among users looking for more privacy and security features, along with data compression capabilities that make it suitable for users with limited bandwidth. Further, Opera has adopted a strategy of focusing on niche features for example gaming browsers (e.g., Opera GX).[118]

4.4 Market development and the browser wars

The browser market has had different market leaders over time (see Figure 4.1), with periods of intense competition referred to as the "browser wars" – notably, two market phases where providers competed aggressively for market dominance.

[110] **https://www.adroitte.com/blog/web-development/the-power-of-mobile-how-mobile-first-design-is-revolutionizing-web-development/.**
[111] **https://medium.com/@SantaBrowser/the-browser-wars-91aa59be29cd.**
[112] **https://medium.com/@abbas143/list-of-100-web-browsers-across-various-platforms-df43ab1b0ab6.**
[113] **https://www.investopedia.com/articles/investing/041315/how-mozilla-firefox-and-google-chrome-make-money.asp.**
[114] **https://www.mozilla.org/en-US/firefox/browsers/browser-history/.**
[115] **https://medium.com/@abbas143/list-of-100-web-browsers-across-various-platforms-df43ab1b0ab6.**
[116] **https://uk.pcmag.com/browsers/131976/chrome-edge-firefox-opera-or-safari-which-browser-is-best.**
[117] **https://medium.com/@abbas143/list-of-100-web-browsers-across-various-platforms-df43ab1b0ab6.**
[118] **https://www.opera.com/gx.**

The original browsers

The first internet browser, WorldWideWeb (later renamed Nexus), was launched in 1990. By 1992-1993, several other browsers such as Lynx (a text-based browser) entered the market.[119]

In 1994, the browser Netscape Navigator was launched.[120] Netscape introduced JavaScript, giving websites powerful new computing capabilities.[121] Netscape became the first widely used web browser, significantly improving accessibility for non-technical users and making the internet more user-friendly.[122]

In 1995, Microsoft released its own browser, Internet Explorer.[123]

The first browser war

The first browser war took place in the late 1990s between Internet Explorer (IE) and Netscape Navigator. At the time of IE's launch, Netscape had an estimated user share of more than 80 pct.[124] Netscape Communications was a software company with its main revenue stemming from users purchasing the Netscape Navigator browser for a retail price of approximately $ 50.[125] Microsoft, on the other hand, was an established software company which had the necessary financial and technological scale to develop a better web browser, IE, offered free of charge to its users.[126]

To challenge Netscape, Microsoft negotiated exclusive deals with computer manufacturers like Compaq, Dell, and IBM, to preinstall IE on new computers.[127] By 1997 IE had become the default browser on Windows, which then had a 90 pct. share of the desktop operating system market ensuring widespread distribution.

IE surpassed Netscape's user share in 1999, and peaked in 2004 with a 95 pct. share.[128] However, between 2001 and 2006, IE released only one update. The lack of regular updates and innovation opened the door for new entrants,[129] and IE's underlying architecture became increasingly outdated, struggling to support newer web technologies.[130]

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[119] As of 2024, Lynx is the oldest web browser still being maintained, **https://lynx.invisible-island.net/current/.**

[120] **https://www.elegantthemes.com/blog/editorial/the-current-state-of-the-internet-browser-wars#internet-explorer.**

[121] **https://www.mozilla.org/en-US/firefox/browsers/browser-history/.**

[122] **https://www.illumy.com/netscape-navigator/.**

[123] **https://medium.com/@traciemasek/a-brief-history-of-the-original-browsers-and-the-first-browser-war-7823fdf756fe.**

[124] **https://www.illumy.com/netscape-navigator/.**

[125] **https://money.cnn.com/1998/01/05/technology/netscape/.**

[126] **https://www.investopedia.com/ask/answers/09/browser-wars-netscape-internet-explorer.asp.**

[127] *"With respect to distribution through OEMs, the Statement of Objections noted that OEMs enter into licensing agreements with Microsoft whereby the OEMs are entitled to pre-install Windows on the client PCs which they assemble and distribute. Under Microsoft's licensing model, OEMs must license Windows with Internet Explorer pre-installed."* Case AT.*39530 Microsoft (tying*), Commission decision of 16 December 2009, recital 42. Further, see **https://www.linkedin.com/pulse/netscape-microsoft-browser-wars-story-unethical-tactics-m%C3%ADra-podorsk%C3%BD.**

[128] **https://www.visualcapitalist.com/internet-browser-market-share/.**

[129] Konkurrence- og Forbrugerstyrelsen (2021), Konkurrencen på markeder med digitale platforme – boks 2.1.

[130] **https://freedom.press/training/-depth-guide-choosing-web-browser/** and *"Internet Explorer was not standards compliant and was slow to adopt new features or implementations of JavaScript, so the world was stuck designing websites to work on a mediocre browser with a mediocre engine*." **https://medium.com/@jonbiro/browser-engines-chromium-v8-blink-gecko-webkit-98d6b0490968.**

The second browser war

The mid-2000's marked a shift in the browser market. In 2004, Mozilla Firefox was launched and steadily gained users through to 2010 positioning itself as a browser promoting openness, innovation, and user control.[131] Firefox aimed to challenge Internet Explorer by offering a browser that was faster, more secure, and more customisable, with a commitment to protecting user privacy and adhering to open web standards.

However, the launch of Google Chrome in 2008 reshaped the landscape once again. Chrome quickly became popular[132] due to its speed, simplicity, stability, and frequent updates. [133] By 2012, Chrome surpassed Internet Explorer to become the world's most used browser.[134]

Meanwhile, Apple launched Safari in 2003, which gained traction as the default browser across all Apple devices – especially following the release of the first iPhone in 2007. Safari has remained the default ever since. Microsoft later launched Edge in 2015 in an attempt to regain lost user share.[135]

The browser market today

As of 2025, Chrome holds a global user share of 66 pct., followed by Safari at 17 pct., (see Figure 4.1). On mobile devices and tablets, Chrome also has a global user share of 67 pct., while Safari holds 23 pct., indicating Safari has a relatively stronger position on mobile platforms than on desktop.

Today, smartphone usage has not only pushed browser providers to develop mobile-friendly versions,[136] but has also reduced the centrality of browsers. Since smartphones are centered around apps, users increasingly access the internet via applications rather than through browsers.[137] Combined with the fact that web browsers are often seen as a low-interest product, this shift has made browsers a less essential gateway to online content, particularly in mobile usage contexts.

4.5 Assessment of presence of market tipping factors

Network effects

The web browser market exhibits indirect network effects, as browsers become more valuable to internet users when more content is created by independent web developers. To incentivise

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[131] **https://www.mozilla.org/en-US/firefox/browsers/browser-history/.**

[132] **https://www.linkedin.com/pulse/google-pioneering-innovation-agile-methodologies-david-mccreery-qax8e**

[133] Defined as a software development approach that breaks the process of developing a large application into smaller parts.

[134] **https://gs.statcounter.com/browser-market-share#yearly-2009-2024.**

[135] See **https://www.elegantthemes.com/blog/editorial/the-current-state-of-the-internet-browser-wars#internet-explorer** and **https://medium.com/@skyletayler/the-war-of-browsers-2efde1448f6c.**

[136] A 2024 survey asked respondents if they conduct various online tasks on their smartphone via a web browser or an application. "Reading e-mails" was the online task that the highest share of smartphone users use their web browser for, but even for that task, only one third used their smartphone's web browser, see Fichte and York, 2024, How do smartphone users access the internet? An exploratory analysis of mobile web browser use**, https://journals.sagepub.com/doi/epub/10.1177/20501579241274781**.

[137] Applications use Application Programming Interfaces (APIs) to communicate and retrieve data directly from servers, instead of via a web browser. See for example **https://developer.mozilla.org/en-US/docs/Web/Progressive_web_apps/Tutorials/js13kGames/Offline_Service_workers** or **https://developer.apple.com/documentation/safariservices/sfsafariviewcontroller**.

web developers to create content for a particular browser, a browser must have a significant user base.[138]

For example, Google Chrome benefits from a large user base, prompting developers to prioritise compatibility with Chrome. This improves user experience, which in turn attracts more users and further reinforces developer preference – a self-reinforcing loop.

However, users do not directly benefit from an increasing number of other users on the same browser, as long as websites function across browsers. Similarly, developers benefit as long as their sites are accessible from any browser. Thus, direct network effects are minimal.

It appears that network effects are not the primary driver of tipping in this market. Notably, the low switching costs meant that even strong indirect network effects and first-mover advantages could not shield Internet Explorer from being overtaken by more innovative competitors.

Single-homing

The user-side of the market tends to single-home, largely due to default settings and habitual usage. Although users can switch or use multiple browsers (multi-homing), only one can be set as the default, and this heavily influences user behaviour (even though it is possible to change default settings, and set different default web browsers across devices, etc.).[139]

Users exhibit "*status quo bias*", meaning they are unlikely to switch browsers – even if alternatives offer marginally better features – unless prompted to actively make a choice.[140] Following a 2009 competition case settlement, Microsoft introduced a browser choice screen for Windows users in the EU[141] which resulted in 165 million new browser installations from 795 million views.[142]

Similarly, after the Digital Markets Act (DMA) came into force, requiring gatekeepers to facilitate easier switching (e.g. through browser choice screens), several smaller browsers experienced a rise in user numbers.[143] However, it remains to be seen to what extent the DMA induces a "permanent" and substantial shift in switching or multi-homing behaviour among users – and thus how strong the end user's "default bias" is.

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[138] *"Web browsers constitute platform software because applications and content are developed for them. The Commission preliminarily considered that content providers and software developers look at installation and usage shares of web browsers when deciding – under resource constraints – on the basis of which technology to develop web applications or to create web content."* Case AT.*39530 Microsoft (tying*), Commission decision of 16 December 2009, recital 55.

[139] The EU Commission noted that: *"The reason why pre-installation, like default setting or premium placement, can increase significantly on a lasting basis the usage of the service provided by an app is that users that find apps pre-installed and presented to them on their smart mobile devices are likely to "stick" to those apps. HP described the creation of a "status quo bias" in the form of premium placement and default setting as follows: "Premium placement and default settings give applications and services located in those positions the advantage of being the first things users see when they start to interact with their device. Users are more likely to try these applications/services based on their prominent visibility and once they are using them, they usually continue to do so. It is an easy way to obtain new users and deliver almost automatic stickiness for an application or service.""* Case AT.40099 *Google Android*, Commission decision of 18 July 2018, recital 781.

[140] T-604/18 – Google and Alphabet v. Commission (Google Android).

[141] The European Commission argued that Microsoft's tying of Internet Explorer with the Windows operating system hindered competition on the merits between web browsers, as IE enjoyed a distribution advantage that other web browsers were unable to match, and that there were barriers to downloading alternative web browsers from the internet, cf. Case AT.*39530 Microsoft (tying*), Commission decision of 16 December 2009.

[142] **https://www.cio.de/article/3676198/microsoft-kills-eu-browser-choice-screen-4.html.**

[143] Reuters, 10 April 2024, *Exclusive: EU's new tech laws are working; small browsers gain market share*, **https://www.reuters.com/technology/eus-new-tech-laws-are-working-small-browsers-gain-market-share-2024-04-10/**.

Web content developers often multi-home, as developers test and optimise websites across different browsers. However, this can come with costs, due to differences in browser engines (Blink, WebKit, Gecko, etc.) and their interpretation of HTML, CSS, and JavaScript.[144]

Thus, while developers' multi-home, the significant single-homing behaviour among users due to inertia and default settings increases the likelihood of market tipping.

Switching barriers

There are no financial switching costs for internet users but behavioural switching barriers are considerable. These include personalised settings, familiarity with the current web browser, "default bias", search history and other forms of visible personalisation (e.g. "favourite" websites and bookmarks), that make users reluctant to switch to (or alternate, i.e. multi-homing) alternative browsers. The more visible the personalisation, the stronger the inertia – greater than for services like search engines, where personalisation is less central.

Developers may also incur costs from designing and testing for multiple browsers, including time, training, and subscription fees for cross-browser testing tools.[145] However, these costs are generally considered manageable.

Scale benefits

Web browsers benefit from scale through improved performance, lower per-user costs, stronger third-party support, enhanced security, and more effective revenue generation. A large user base and access to capital allow popular browsers to continuously invest in and improve their services to a greater extent than smaller alternatives, reinforcing their market position and fueling a cycle of growth and innovation.

Developing and maintaining a modern large-scale web browser requires substantial engineering resources to build and update core components, including the browser engine[146], ensure compatibility with evolving web standards, and optimise performance for speed and efficiency.[147] Frequent security updates are also essential to protect users from vulnerabilities, cross-site tracking,[148] malware and phishing attacks. Ensuring compliance with international standards and cross-device compatibility adds further complexity.

That said, the wide availability of niche browsers suggests that financial scale is not a significant barrier to market entry – but it does limit the ability of smaller browsers to grow large enough to significantly challenge dominant incumbents. For example, access to financial capital was a key factor behind Internet Explorer's ability to challenge Netscape in the first browser war.

However, scale alone is not sufficient to allow a popular web browser provider to rest on its laurels. Internet Explorer enjoyed a significant scale advantage in the early and mid-2000s, yet it was overtaken within a decade. Today, financial scale also does not appear to be sufficient to

[144] There are different tools web developers can use when developing for different browsers. Developers often use automated tools for example Browser Stack, Selenium, or Cross Browser Testing to simulate how websites will behave on multiple browsers and devices without manually checking each one, **https://www.browserstack.com/cross-browser-testing**.

[145] **https://www.browserstack.com/pricing?cycle=annual.**

[146] Different browsers use different browser engines. For example, Chrome, Edge and Opera use the Blink engine (which is based on Chromium), Firefox uses Gecko, and Safari uses WebKit. These engines can interpret HTML, CSS, and JavaScript slightly differently, potentially causing layout or functionality issues if not tested across browsers by web content developers.

[147] **https://daily.dev/blog/make-a-web-browser-beginners-guide.**

[148] **https://support.apple.com/da-dk/guide/safari/sfri40732/mac.**

challenge incumbent market leaders, evidenced by the limited growth of Microsoft Edge, despite Microsoft's vast resources.

Data advantages

Data advantages do not appear to be a primary factor in the web browser market. The value of a web browser primarily depends on the quantity and quality of the content it can render. Nonetheless, data-enabled learning can enhance browser quality by allowing providers to analyse user behaviour, optimise performance, and offer more personalised services.

Browsers can collect large amounts of data, such as search history, browsing habits, and site preferences – useful for targeted advertising and content personalisation. In an ecosystem context, such data can also improve other services. For instance, Google uses data from Chrome to enhance its search engine.[149]

Ecosystem

Web browsers are increasingly part of broader digital ecosystems. Providing a browser allows firms to steer users toward other services within their ecosystem – such as search engines or e-mail – through features like auto-login, seamless integration, and default status on operating systems. The most popular web browsers are often set as default in various operating systems. For example, Internet Explorer was the default on Windows,[150] Safari is default on Apple devices, and Chrome is typically default on Android. Web content developers benefit from support and tools made available by the web browser providers, and end-users can access various services with e.g. single login functions and seamless interoperability.

In this way, web browsers are part of a broader digital ecosystem. Their role within these ecosystems enhances the provider's ability to attract users to other services (e.g. search engines, email services) through features such as auto-login, prominent visibility, and seamless integration.

This suggests, that having an ecosystem increases the likelihood of tipping in this market. The three largest web browsers – Chrome, Safari, and Edge – are all provided by tech firms with extensive ecosystems of digital services. The dominance of certain browsers is reinforced by default settings on operating systems, creating a strong connection between browsers and their associated ecosystems.

First-mover and/or first-leader advantage

The browser market has seen multiple leadership changes over the past 30 years. Both Netscape and Internet Explorer once held substantial market shares but eventually lost their positions. This historical volatility indicates that first-mover or first-leader positions do not constitute a strong tipping factor in this market.

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[149] **https://www.forbes.com/sites/zakdoffman/2024/07/12/new-google-chrome-warning-for-microsoft-windows-10-windows-11-users/.**

[150] "*The Commission preliminarily concluded in the Statement of Objections that all those constituent elements of a tying abuse under Article 102 of the TFEU were present as regards Microsoft's tying of Internet Explorer to its dominant client PC operating system Windows.*" Case AT.*39530 Microsoft (tying*), Commission decision of 16 December 2009, recital 35.

Free services
Initially, Netscape Navigator was sold to users for around $ 50. Microsoft changed the market dynamic by launching Internet Explorer as a free product,[151] prompting Netscape to follow suit in 1998.[152] All major browsers today – Chrome, Safari, Edge, and Firefox – are free to users.

For web content developers, it is possible to develop content free of charge.[153] Although developing content for multiple browsers may involve minor costs (e.g. time, training, and testing), these are generally non-significant.

The widespread adoption of the free model removed price as a competitive factor, intensifying competition. This enhances the likelihood of tipping, as browsers can attract a large user base without price barriers, reinforcing their position through network effects.

Differentiation and preference heterogeneity
From the supply side, browsers are somewhat differentiated based on performance, privacy, security, and design. However, from the demand side, there appears to be limited preference heterogeneity.

Ultimately, the primary function of a web browser is to allow users to access web content and for content providers to reach users. As long as browsers adequately meet the users' core need – to access web content – product differentiation is restricted.

While some users are more concerned about privacy than others, the relatively low market share of privacy-focused browsers suggests that demand for such features remains niche (a similar observation can be made in the search engine market, see chapter 3). Therefore, the low degree of product and preference heterogeneity does not appear to have significantly decreased the likelihood of tipping.

Interoperability
Today, most browsers are highly interoperable due to common web standards (e.g. HTML, CSS, JavaScript), ensuring that websites display and function consistently across platforms.[154]

However, this has not always been the case and the current level of interoperability is in part the result of antitrust enforcement. During the first browser war, Netscape and Internet Explorer operated with different technologies, which led to significant compatibility issues across websites.

In 1998, Microsoft was accused of limiting third-party access to APIs, making it difficult for competitors like Netscape to access the essential Windows platform resources.[155] This hindered competing browsers' ability to perform as seamlessly as Internet Explorer on Windows. Following a 2001 settlement with the U.S. Department of Justice, Microsoft agreed to expand API access to third-party developers in order to improve interoperability.[156]

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[151] **https://money.cnn.com/1998/01/05/technology/netscape/.**
[152] **https://alexlewyl.medium.com/the-reasons-for-netscapes-failure-85a4479bcb40.**
[153] **https://www.forbes.com/advisor/business/build-a-website-for-free/.**
[154] **https://medium.com/@rahul660singh/web-browsers-engine-5a4522621f00.**
[155] U.S. Microsoft V. Microsoft Corp., Civil Action No. 98-1232.
[156] In 2004, the European Commission had a similar case, where Microsoft was required to disclose detailed documentation to rival software companies, enabling them to develop products, including browsers, that could operate effectively with the

In 2004, Mozilla launched Firefox, which promoted open web standards, further driving interoperability.[157] Google's Chromium project later contributed to this trend by open-sourcing the core code behind Google Chrome, with the stated aim of making browsers faster, more secure, and more stable.[158]

Until 2024, Apple only permitted browsers built on its WebKit engine to run on iOS. This meant that iOS browsers were restricted to using WebKit, limiting functionality and preventing support for many features and extensions available on non-Apple platforms.[159] To comply with the Digital Markets Act (DMA), Apple introduced iOS version 17.4, which allows alternative browser engines to operate on iOS – but only for users in the EU.[160]

In summary, the web browser market has not always been as interoperable as it is today. Over time, interoperability has improved significantly – largely due to regulatory intervention and the broader adoption of shared web standards. While occasional differences remain due to browser-specific features or newer technologies, most websites now behave consistently across all major browsers.[161]

Innovation

The web browser market is characterised by continuous innovation, with various providers introducing new and improved products that have repeatedly challenged the dominance of leading competitors.

Initially, Internet Explorer disrupted Netscape's market position by investing in research and development to deliver more advanced browser versions.[162] Later, Firefox entered the market with a browser that was faster, more secure, and highly customisable, emphasising user privacy and compliance with open web standards.[163] The launch of Google Chrome further reshaped the market. With its simplicity, speed, stability, and rapid development cycle, Chrome quickly became the web browser of choice for many users.[164]

These examples demonstrate how innovative contributions have repeatedly disrupted the competitive landscape. In this way, innovation has functioned as an endogenous market shock, enabling new entrants to exert competitive pressure on incumbents and, in some cases, dominate the market for a period of time.

Windows system, cf. Commission decision of 24 March 2004 in Case COMP/C-3/37.792 – Microsoft. Further, see **https://www.justice.gov/atr/case-document/file/503541/dl.**

[157] **https://www.mozilla.org/en-US/firefox/browsers/browser-history/.**

[158] **https://www.chromium.org/chromium-projects/.**

[159] Up until 2024, Apple only allowed browsers built on WebKit to run on Apple's operating systems. Thus, iOS browsers were forced to run on WebKit which resulted in many features and extensions not working on Apple devices **https://www.theverge.com/2024/1/25/24050478/apple-ios-17-4-browser-engines-eu.**

[160] However, "*Each developer will have to be authorized by Apple to switch engines "after meeting specific criteria and committing to a number of ongoing privacy and security mitigations,*" **https://www.theverge.com/2024/1/25/24050478/apple-ios-17-4-browser-engines-eu.**

[161] One example is Safari's Intelligent Tracking Prevention (ITP), which limits how advertisers and third-party trackers can follow users across websites, **https://www.apple.com/safari/docs/Safari_White_Paper_Nov_2019.pdf**. This privacy-focused feature is specific to Safari and not available in Chrome or Firefox. Because websites that rely heavily on cross-site tracking for personalized ads may not function the same way in Safari, potentially leading to reduced ad effectiveness.

[162] **https://alexlewyl.medium.com/the-reasons-for-netscapes-failure-85a4479bcb40.**

[163] **https://www.mozilla.org/en-US/firefox/browsers/browser-history/.**

[164] **https://www.linkedin.com/pulse/google-pioneering-innovation-agile-methodologies-david-mccreery-qax8e.**

In addition, the rise of smartphones and other handheld devices contributed an exogenous shock to the browser market. This shift forced providers to develop or adapt their browsers to meet the unique requirements of mobile browsing – for example, enabling websites to function well across both laptop and mobile devices, minimising battery usage, and ensuring interoperability between mobile and desktop versions of the same browser.

Regulation and anti-competitive practices

The browser market has also been shaped by regulatory interventions and anti-competitive practices.[165] For example, the 2009 European Commission decision (Case AT.39530 – *Microsoft (tying)*) found Microsoft had granted Internet Explorer unfair advantages.

In addition, the DMA obliges gatekeepers (which include the providers of the most popular web browsers) to present users with a choice screen for selecting default browsers and to make it easy to switch. Following the DMA's enforcement, smaller browsers experienced increased user uptake. However, these shifts have not yet led to significant changes in overall user shares in the EU.

4.6 Conclusion: A stable duopoly

Based on the market's development and the analysis of relevant market characteristics and tipping factors, there are reasons to conclude that the web browser market has tipped into a stable duopoly dominated by Google's Chrome and Apple's Safari, despite Microsoft Edge's slow but steady growth in recent years.

However, the history of the web browser market demonstrate that market leaders cannot afford to be "lazy". Without continuous improvements and adjustments to meet user expectations – particularly regarding security and privacy protection needs – web browser providers risk losing user share. Thus, while the market currently appears to have tipped, there seems to be, prima facie, sufficient competitive pressure from alternative browser to force the market winners to innovate.

A central contributor to the tipping of the web browser market is the close link between browser choice and the choice of other products, especially operating systems, which are in turn tied to specific devices. The three largest web browsers are all provided by tech firms with extensive digital ecosystems. These ecosystems serve as gateways to reach and retain users – often by setting specific browsers as the default option on devices. This default status, combined with the ability to collect user data and steer users toward other services within the ecosystem, gives providers both the incentive and the means to reinforce their market positions.

In contrast, Mozilla's Firefox – the previous main challenger, whose rise in user share was interrupted by the launch of Google Chrome – lacks such a digital ecosystem. This puts it at a disadvantage when attracting and retaining users. Nevertheless, as long as providers like Mozilla can sustainably offer competitive services, there remains at least some degree of competitive pressure on the market leaders.

[165] In particular, both Microsoft and Google have engaged in abusive tying and bundling practices. This is demonstrated in the Commission decision of 24 March 2004 in Case COMP/C-3/37.792 Microsoft and the EU Commission Decision of 16 December 2009 Case AT.39530 *Microsoft (tying)* which involve Microsoft as well as the Commission Decision of 18 July 2018 case AT.40099 *Google Android* which highlights Google's similar practices.

The current tipped state of the web browser market is significantly less established – approximately five years – compared to the search engine market (see chapter 3), which has been tipped for at least 15-20 years. Another important difference is the market structure: while the browser market has tipped into a duopoly, the search engine market resembles a monopoly. Additionally, the combined user share of the two leading browsers in 2025 (83 pct.) is still lower than Google Search's user share (91 pct.).

Therefore, the conclusion that the web browser market has tipped is, at least currently, less robust than in the search engine case. The browser market illustrates how competitor-driven innovation can disrupt a tipped market. New technologies, alternative business models, and strategic approaches offer challengers opportunities to compete effectively. While the concept of market tipping suggests that a tipped market will remain in that state permanently, it can, in fact, be disrupted by exogenous or endogenous shocks. Factors such as innovation, changes in consumer preferences, or regulatory interventions can shift the market equilibrium and enable competitors to re-enter.

Moreover, the DCCA assesses that a tipped market can indeed evolve into a duopoly. In this specific case, there is reason to believe that, if Apple were to discontinue Safari, the market would tip in favour of Google Chrome. This is supported by the fact that Safari is only available on Apple devices and therefore only used by Apple users. However, Google Chrome is already the most used browser among iPhone users in the U.S.[166] Without Safari's default status and integration into Apple's ecosystem, it is unlikely that Safari would have reached or maintained its current user share.

The web browser shares several characteristics with the search engine market, that makes it prone to tipping – such as being free for users, benefiting from economies of scale, the role of default settings in fostering single-homing, the strategic value of digital ecosystems, and strong interoperability.

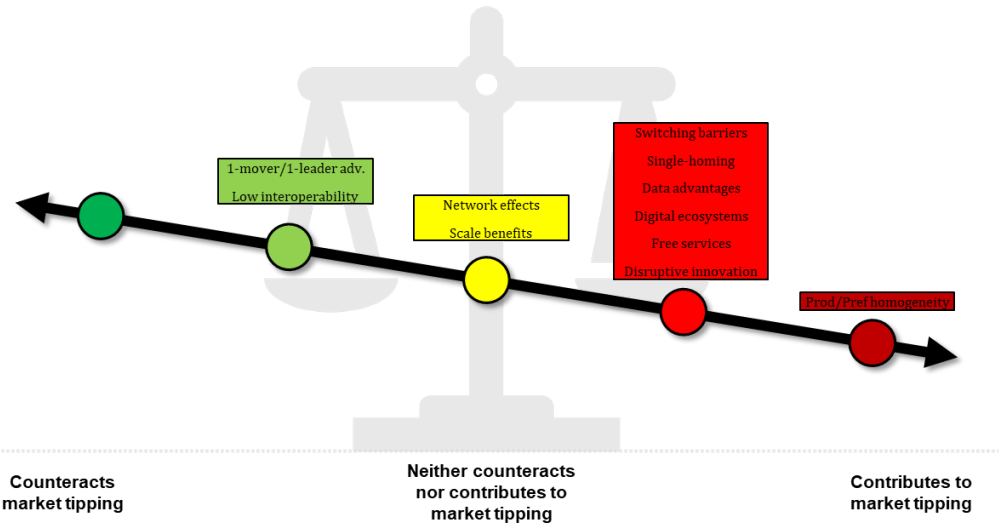
However, data advantages – while relevant – appear to play a comparatively smaller role in tipping the browser market than they do in the search engine market. Certainly, Browsers do collect and analyse user data (e.g. for performance, security, and user experience improvements), but the level of personalisation is far lower. For instance, if two separate users' type "www.nike.com" in their browser, both will be directed to Nike's homepage. In contrast, if those same users search for "Nike running shoes," the search engine may return entirely different results based on each user's history, preferences, or demographics. This highlights how data advantages in the search engine market are both more significant and harder to replicate than in the browser market.

Overall, while the browser market shares several tipping characteristics with the search engine market it also displays more counterbalancing factors – such as higher interoperability, regulatory interventions and frequent innovation-driven disruptions – that reduce the likelihood of tipping. These continuous endogenous shocks to the market help ensuring a competitive pressure and prevent the market from remaining in a tipped state for too long.

Figure 4.2 summarises and illustrates the presence and strength of the market tipping factors in the market for web browsers.

[166] The picture might be different when looking at European or Danish iPhone users. In fact, looking at the Danish user shares for mobile browsers, Safari is the most popular browser for mobile devices, with a user share of 52 pct. in 2024, compared to Chrome's 40 pct. **https://gs.statcounter.com/browser-market-share/mobile/denmark/#yearly-2009-2024.**

Figure 4.2 **Summary of market tipping factors in the market for web browsers**



Source: DCCA analysis.

Chapter 5
Social networking services

5.1 Introduction

Social media platforms, including the social networking services market, exemplify platform-based services where network effects are central to individual user value – yet not sufficient to cause the market to tip. Facebook has maintained a strong position for several years.[167] However, unlike the search and browser markets described above, this market appears to be more segmented, with different user groups engaging with a variety of social networking services and frequently multi-homing.

There are several ways to approach the analysis of whether the market has tipped – and how different factors each contribute to this outcome. In the following, the DCCA bases its analysis on the European Commission's recent decision regarding Facebook Marketplace as a practical starting point. Here, the market is defined as the market for personal social networks, covering at least the European Economic Area ('EEA').[168] This market includes personal social networking services such as Facebook, Instagram, TikTok, and Snapchat, but excludes professional networks like LinkedIn and video-sharing platform such as YouTube.

5.2 Personal social networking services

The broader category of social media platforms includes a wide range of online media platforms involving communication and content engagement.[169] These platforms all share some common features, such as user profiles, a feed or homepage which users can view and interact with.

For instance, some platforms like X (formerly Twitter) and Threads are primarily focused on text-based communication, while others, such as TikTok, center around short-form video content. Instagram combines multiple features, offering both content discovery and communication tools. Within this broader landscape, personal social networking services refer specifically to platforms whose primary function is to facilitate the maintenance and development of personal relationships.

Most social networking services are multi-sided platforms. They connect private end-users – individuals who use the service to interact with others and share content for non-financial purposes – with content providers, who may be individuals or firms uploading content for

[167] See **https://gs.statcounter.com/social-media-stats#yearly-2009-2024.**

[168] AT.40684 *Facebook Marketplace*, Commission decision of 14 November 2024. Press release: **https://ec.europa.eu/commission/presscorner/detail/en/ip_24_5801.**

[169] The CMA use the term 'social media' in a broad sense to describe a range of online platforms that allow consumers to interact with each other and with engaging content in its market study July 2020 *Online platforms and digital advertising*, page 114: **https://assets.publishing.service.gov.uk/media/5fa557668fa8f5788db46efc/Final_report_Digital_ALT_TEXT.pdf.**

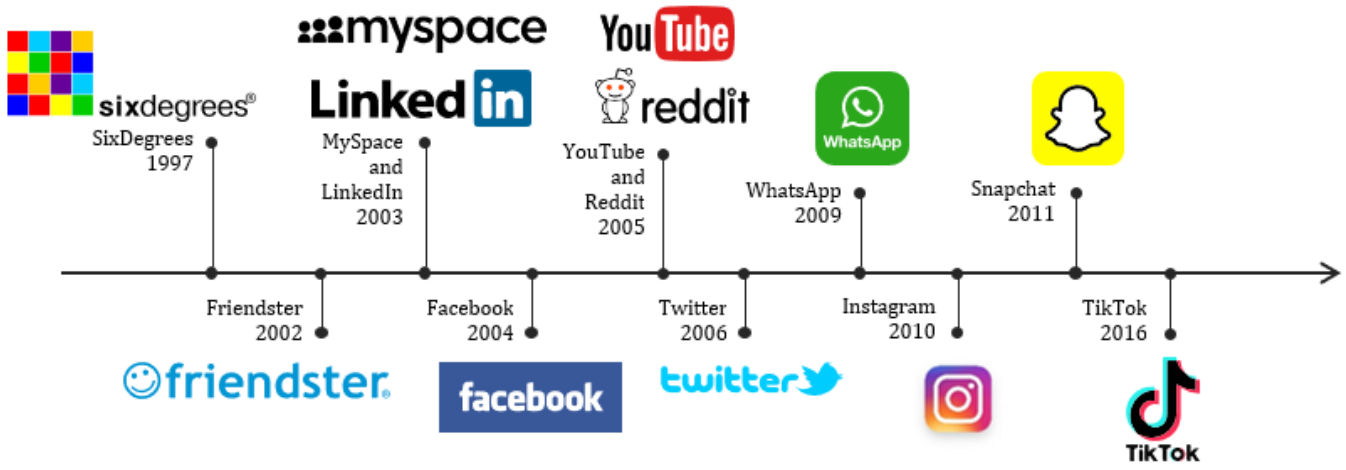
direct or indirect commercial gain, and with advertisers, whose advertising expenditure typically finances the use of the platform for the other two groups.[170]

According to the European Commission's previous decisions, social networking services share a number of core functionalities. These typically include the ability to create a public or semi-public profile and a list of contacts. They often allow for features such as exchanging messages – whether one-to-one, one-to-group or one-to-many – sharing content such as images, videos or links, commenting on posts or recommending content to others.[171] According to the Commission: "*Their* [the platforms] *business models and functionalities vary considerably and are constantly evolving. While there is no established definition, social networking services can be generally described as services which enable users to connect, share, communicate and express themselves online or through a mobile app.*"[172]

5.3 Market development

Today, more than five billion people worldwide use social media platforms.[173] Facebook is currently the largest social network with three billion monthly active users, followed by Instagram (two billion) and TikTok (1.6 billion).[174]

Figure 5.1 **Social media platforms timeline**



Source: The DCCA's illustration.

[170] Commission decision of 3 October 2014 in Case M.7217 – *Facebook/WhatsApp*, para. 47.

[171] See Commission decision of 3 October 2014 in Case M.7217 – *Facebook/WhatsApp*, para. 51 and Commission decision of 6 December 2016 in Case M.8124 – *Microsoft/LinkedIn*, para. 98.

[172] Commission decision of 3 October 2014 in Case M.7217 – *Facebook/WhatsApp*, para. 46.

[173] **https://backlinko.com/social-media-users.**

[174] **https://www.statista.com/statistics/272014/global-social-networks-ranked-by-number-of-users/.**

The first social networking services

The very first type of online social media platform was developed in 1973 with Talkomatic, a multi-user chatroom application. However, it was not until 1997 that the first social network resembling the platforms we know today was launched with "Six Degrees", cf. Figure 5.1.

Six Degrees was the first social network that allowed users to create profiles, connect with others, send messages, and post content on a digital board. The platform was shut down in 2001, reportedly because it was ahead of its time – insufficient internet access among users led to low engagement and adaption.

The rise of MySpace and Facebook

In 2003, MySpace was launched revolutionising online social networking as the first global platform.[175] MySpace succeeded in attracting millions of users by enabling them to share music and creative content. By 2004, MySpace had five million users, and by around 2007, it became the most visited website in the U.S., even surpassing the traffic of the leading search engines of the time.[176]

However, MySpace's popularity began to decline due to a cluttered interface overloaded with advertisements, which degraded the user experience. By 2011, it was sold and never regained its former success.

Part of MySpace's decline appears to be linked to the launch of Facebook in 2004. Although Facebook was not a first-mover, it quickly surpassed MySpace in popularity by offering a more sophisticated interface and a significantly improved user experience. Unlike early social networks, Facebook benefited from the growing number of internet users' access, and leveraged lessons learned from the technical and business missteps of its predecessors. Initially limited to Harvard students, Facebook opened its platform to all users in 2006, and by 2008, it had overtaken MySpace in user numbers.[177]

Due to Facebooks more robust and reliable technology infrastructure, it attracted experienced engineers who developed new tools that enabled the platform to scale effectively and meet fast-growing user demand.[178] In 2007, Facebook introduced targeted advertising (Facebook Ads) leveraging millions of data points about user activity.[179] Over time, Facebook integrated internal user data with data about user behaviour outside the platform. Today, Meta raises billions of dollars annually in advertising revenue.[180]

In its market study on online platforms and digital advertising, the UK Competition and Markets Authority (CMA) commented on the transition from MySpace to Facebook: "*It is not clear that the market had fully 'tipped' to Myspace in the first place. Myspace was the most popular platform for only a couple of years, at which time the social media market was growing rapidly*

[175] **https://www.socialchamp.io/blog/first-social-media/.**

[176] **https://medium.com/@mojicacamila/the-evolution-of-myspace-from-peak-to-downfall-02f67e5d3f24** and **https://www.forbes.com/sites/gilpress/2018/04/08/why-facebook-triumphed-over-all-other-social-networks/.**

[177] **https://www.forbes.com/sites/gilpress/2018/04/08/why-facebook-triumphed-over-all-other-social-networks/.**

[178] **https://www.forbes.com/sites/gilpress/2018/04/08/why-facebook-triumphed-over-all-other-social-networks/.**

[179] **https://about.fb.com/news/2007/11/facebook-unveils-facebook-ads/.**

[180] **https://www.statista.com/statistics/271258/facebooks-advertising-revenue-worldwide/.**

and monetisation of social media was in its infancy. By contrast, Facebook has been the most popular social media platform for over a decade in a far more mature market."[181]

Creation of niche platforms

Following Facebook's rise to dominance in 2008, several new platforms emerged including Instagram in 2010, and Google+ and Snapchat both in 2011. Google introduced Google+ as a competitor to Facebook. However, several factors contributed to its failure and eventual shut down in 2019. One key challenge was that Facebook had already established strong network effects – both in terms of size and quality – making it difficult for Google to attract users.[182] Furthermore, Google+ offered little differentiation from Facebook, which undermined its appeal.

Today, social networking platforms serve diverse purposes, are differentiated, and cater to distinct user segments. Meta, with Facebook and Instagram, remains the largest player in terms of active users. [183] TikTok's platform focuses on short-form video content and employs a mobile-first design driven by algorithmic recommendation engines.[184]

Facebook continues to be not only the largest personal social networking service, but also a dominant force in the broader market for social media platforms. As the CMA notes: "*Facebook grew by offering better products than their rivals. However, they* [Google and Facebook] *are now protected by such strong incumbency advantages – including network effects, economies of scale and unmatchable access to user data – that potential rivals can no longer compete on equal terms."*[185] The CMA concludes that Facebook is a "must-have" platform and has a more extensive consumer network than any other platform. This is the case even though other platforms have entered the market and built substantial user bases by offering differentiated services.

5.4 Assessment of presence of market tipping factors

Network effects

The market for social networking services is characterised by strong direct network effects, as the core purpose of these platforms is to enable users to interact with one another. Network effects are therefore essential to the value proposition for users, and this market factor appears critically important.[186] According to the CMA social media platforms, including social networking services, compete for users through both the size and the type of user network.[187]

Social networking services display both direct and indirect network effects. Private users derive value from maintaining personal relationships with friends, family, and local contacts (direct network effects) as well as from accessing content from public figures, influencers, or

[181] The CMA market study July 2020 *Online platforms and digital advertising*: **https://assets.publishing.service.gov.uk/media/5fa557668fa8f5788db46efc/Final_report_Digital_ALT_TEXT.pdf.**

[182] **https://www.forbes.com/sites/stevedenning/2015/04/17/five-reasons-why-google-died/.**

[183] Considering a broader market for social media platforms YouTube is the second largest platform followed by Instagram and WhatsApp, **https://www.statista.com/statistics/272014/global-social-networks-ranked-by-number-of-users/.**

[184] **https://www.businessresearchinsights.com/market-reports/social-media-platforms-market-110038.**

[185] The CMA market study July 2020 *Online platforms and digital advertising*, page 5: **https://assets.publishing.service.gov.uk/media/5fa557668fa8f5788db46efc/Final_report_Digital_ALT_TEXT.pdf.**

[186] The Commission has stated in its decision of 3 October 2014 in Case M.7217 – *Facebook/WhatsApp*, para. 129 that "*Respondents to the market investigation indicated that the size of the user base and the number of a user's friends/relatives on the same consumer communications app is of important or critical value to customers of consumer communications apps.*" The Commission argued that the same can be said for social networking services which have many overlapping features with consumer communication apps.

[187] The CMA market study July 2020 *Online platforms and digital advertising*, page 116: **https://assets.publishing.service.gov.uk/media/5fa557668fa8f5788db46efc/Final_report_Digital_ALT_TEXT.pdf.**

businesses (indirect network effects). Content providers use the platforms to increase visibility and popularity, which may in turn generate commercial opportunities such as partnerships or promotional activities. Advertisers use the platforms as digital space for targeted marketing campaigns (indirect network effects).[188]

Importantly, network effects in this market can also be negative. This was the case with MySpace, an overload of advertisements degraded the user experience and contributed to the platform's decline.[189] As a result, platforms do not only compete to grow their user base, but also on the quality and relevance of advertising, as excessive advertising is generally disliked by users.[190] Platforms with larger user bases – and thereby access to greater volumes of data – are better equipped to optimise advertising relevance, providing a competitive advantage.

Multi-homing

Users in this market tend to multi-home to a high degree, which reduces the likelihood of market tipping.[191] Some data suggest that the average social media user interacts with approximately 6.8 social media platforms on a monthly basis.[192] A CMA study similarly found that many consumers use more than one social networking service.[193]

This high degree of multi-homing exists despite the importance of network effects, largely because platforms serve different purposes and target different user segments. Further, according to the European Commission, switching barriers in this market are generally low.[194]

Multi-homing is also enabled by the ease of access to platforms via mobile apps or desktops. Apps are generally free,[195] easy to download, and require minimal storage.[196] Moreover, users typically remain logged in across platforms, reducing friction when switching. The Commission further notes that the presence of one large network is unlikely to preclude users from also engaging with competing services.[197]

Switching barriers

There are no financial switching costs for users, and using multiple services simultaneously is also free. However, behavioural barriers such as user inertia can make switching less likely. Familiarity with the incumbent platform, personalisation, and the effort involved in rebuilding an existing network may deter users from migrating fully to alternative services. In addition, the Commission has found that established network effects can act as a switching barrier,

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[188] AT.40684 *Facebook Marketplace*, Commission decision of 14 November 2024, recitals 112-114.

[189] **https://medium.com/@mojicacamila/the-evolution-of-myspace-from-peak-to-downfall-02f67e5d3f24** and **https://www.forbes.com/sites/gilpress/2018/04/08/why-facebook-triumphed-over-all-other-social-networks/.**

[190] The CMA market study July 2020 *Online platforms and digital advertising*, page 116: **https://assets.publishing.service.gov.uk/media/5fa557668fa8f5788db46efc/Final_report_Digital_ALT_TEXT.pdf.**

[191] See Iansiti, M. (2021). Assessing the strength of network effects in social network platforms. *Boston: Harvard Business School* page 6.

[192] **https://backlinko.com/social-media-users.**

[193] The CMA found that 86 pct. of TikTok's audience cross-visited with Facebook, and 90% of Snapchat's audience cross-visited with Facebook, *Online platforms and digital advertising*, page 122: **https://assets.publishing.service.gov.uk/media/5fa557668fa8f5788db46efc/Final_report_Digital_ALT_TEXT.pdf.**

[194] "*The Commission considers that, with the exception of network effects, there is no significant barrier to switching for users in the market for consumer communications apps*", Commission decision of 3 October 2014 in Case M.7217 – *Facebook/WhatsApp*, para. 115. The Commission argued that the same can be said for social networking services which have many overlapping features with consumer communication apps.

[195] See Iansiti, M. (2021). Assessing the strength of network effects in social network platforms. *Boston: Harvard Business School* page 9.

[196] Commission decision of 3 October 2014 in Case M.7217 – *Facebook/WhatsApp*, para. 133.

[197] Commission decision of 3 October 2014 in Case M.7217 – *Facebook/WhatsApp*, para. 133.

noting: "*The market investigation has however revealed that switching providers may be difficult in terms of convenience due to the need for the users to recreate their network*".[198]

The Commission also highlights that users typically must actively download social networking apps, which reduces the influence of pre-installed defaults and associated user inertia. Together, low switching costs, high differentiation, and significant preference heterogeneity promote multi-homing, thereby reducing the risk of tipping.

Scale benefits

Scale in terms of user base and capital enables the most popular platforms to invest more heavily in improving their services, reinforcing their positions through innovation and performance enhancements. Larger platforms also benefit from greater access to user data, allowing for better targeting and optimisation of platform services.

However, scale benefits do not appear to be essential for success or tipping in this market, as demonstrated by the continued presence of smaller, niche platforms.

Even though scale may not be necessary for the market to tip, it is worth noting that the most popular social networking services – namely Facebook, Instagram and TikTok – are provided by big tech companies with access to vast amounts of user data. This access gives them significant advantages in terms of platform optimisation, user targeting, and innovation.[199]

Data advantages

Platforms benefit significantly from data-enabled learning, using behavioural data to enhance personalisation, optimise algorithms, and improve user experience. This also enables highly targeted advertising, which has become a major source of revenue – especially for Meta, which leverages its vast data pool to sell advertising space efficiently.

The use of algorithmic recommendation engines has become particularly relevant as it can personalise the content to a higher degree which can attract more users to join a service. For instance, TikTok's content feed is entirely algorithm-driven, delivering personalised video recommendations as soon as the app is opened.[200] This innovation has made TikTok the leading platform for short-form video content.[201]

These data and algorithmic advantages create self-reinforcing cycles of engagement and growth. This highlights the growing importance of data and algorithms in driving platform competitiveness and user retention.

While data advantages and algorithmic personalisation typically increase the likelihood of tipping by creating strong self-reinforcing feedback loops, the market's high degree of differentiation, user multi-homing, and preference heterogeneity collectively weaken the tipping effect of such advantages.

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[198] Commission decision of 3 October 2014 in Case M.7217 – *Facebook/WhatsApp*, para. 114.

[199] ByteDans, the company behind TikTok, has become the fourth largest global media company after Alphabet, meta and Comcast, see **https://www.statista.com/topics/10376/bytedance/.**

[200] **https://www.wordstream.com/blog/tiktok-algorithm.**

[201] **https://www.nytimes.com/2021/12/05/business/media/tiktok-algorithm.html.**

Ecosystem
Meta, the company behind Facebook and Instagram, operates a broader ecosystem that includes WhatsApp and Facebook Messenger. According to the CMA: "*The wider 'family' of Facebook platforms reinforces Facebook's competitive position; consumers that 'switch' some of their time away from the Facebook platform may remain within the Facebook 'ecosystem' of apps*".[202] Meta is also active in developing foundation models for generative AI and other adjacent tech markets (see chapter 7 of this report).

Meta also collects and analyses user data across its services, which enhances personalisation and advertising performance. Nevertheless, the lack of full interoperability between these services limits the ecosystem's overall user-side value. Having a Facebook profile does not inherently increase the utility of also using Instagram or WhatsApp. Despite Meta's advantages, many competitors without integrated ecosystems have succeeded, suggesting that ecosystem effects in this market do not strongly drive tipping.

First-mover advantages
The market does not appear to exhibit strong first-mover advantages. On the contrary, platforms like Six Degrees and MySpace illustrate the risks of being early entrants. Facebook, by contrast, benefited from second-mover advantages, launching in a more mature market and learning from earlier failures.[203] First-mover advantages have therefore not contributed significantly to market tipping in this case.

Free services
This market is characterised by zero-price offerings for private users. Platforms are monetised primarily through advertising, with users indirectly paying through the provision of data. Meta, for example, generates the majority of its revenue from selling ad space to third parties. The absence of user fees contributes to high levels of multi-homing, as there are no financial disincentives to joining multiple platforms simultaneously.

Horizontal differentiation and preference heterogeneity
The market is characterised by a high degree of horizontal differentiation across platforms and significant preference heterogeneity. While all social networking services offer some combination of communication and content engagement, they serve distinct primary functions. Snapchat, Instagram, and TikTok all include messaging features, but Instagram and TikTok prioritise content discovery, while Snapchat focuses on peer-to-peer photo communication.

According to the Commission the various platforms are rather complements than substitutes: "*Given the high degree of differentiation between the above-mentioned providers, they are not used exclusively by consumers but rather in a complementary manner depending on a specific need. Indeed, as mentioned in paragraph (109), users of consumer communications apps extensively multi-home. In addition, the respondents to the market investigation confirm that users of consumer communications apps to a large extent also tend to use (other) social networking services.*"[204]

[202] The CMA market study July 2020 *Online platforms and digital advertising*, page 130: **https://assets.publishing.service.gov.uk/media/5fa557668fa8f5788db46efc/Final_report_Digital_ALT_TEXT.pdf.**
[203] Unlike earlier social networks that were first-movers in the market, Facebook benefited from the growing number of people with internet access and leveraged lessons learned from the technical and business mistakes of its predecessors, **https://www.forbes.com/sites/gilpress/2018/04/08/why-facebook-triumphed-over-all-other-social-networks/.**
[204] Commission decision of 3 October 2014 in Case M.7217 – *Facebook/WhatsApp*, para. 151.

This is supported by the findings of the CMA, which states that: "*Despite sharing basic functionalities, we found that these platforms are differentiated in important ways, including in the user needs they meet.*"[205] This differentiation and preference heterogeneity encourage multi-homing behavior and reduces the likelihood of market tipping.

Interoperability

There is a low degree of interoperability across social networking services even within the same ecosystem. For example, content on Facebook cannot be accessed directly from Instagram, despite both being owned by Meta. Low interoperability reinforces platform lock-in, as users cannot easily transfer content, contacts, or features across platforms. This increases the likelihood of tipping by making switching more difficult.

Innovation

The market is characterised by continuous innovation from its players, as evidenced by the presence of multiple competitors offering distinct services. According to the CMA, the social networking services compete through innovative features, where the platforms offers innovative new ways to communicate in order to attract consumer attention.[206]

Facebook surpassed MySpace in part due to its superior technology infrastructure and its ability to attract skilled engineers who developed tools to scale the platform.[207] The introduction of Facebook Ads also marked a significant innovation that helped consolidate its position.

Later entrants such as Snapchat and TikTok have continued this trend of innovation, offering new formats and user experiences tailored to specific needs and segments. This constant differentiation appears to have been key to preventing market tipping in favour of a single player.

5.5 Conclusion: Network effects are not sufficient to make this market tip

According to the European Commission's recent decision, Meta holds a dominant position in the market for personal social networks, which is defined as covering at least the European Economic Area ('EEA'). In terms of active users, Facebook is by far the largest player both within the personal social networking market and in the broader market for social media platforms.[208] However, despite the presence of one major player, the market does not appear to have tipped.

The market is characterised by a diverse set of differentiated players, with users of social media platforms - including social networking services – engaging in a high degree of multi-homing. This stands in contrast to the previously discussed markets for general online search engines and web browsers, where tipping has occurred or been more pronounced.

Platforms such as Facebook, Instagram, and TikTok differentiate themselves by catering to distinct user needs. Additionally, there is substantial preference heterogeneity among users, with platforms targeting different demographics and offering different functionalities.

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[205] The CMA market study July 2020 *Online platforms and digital advertising*, page 118: **https://assets.publishing.service.gov.uk/media/5fa557668fa8f5788db46efc/Final_report_Digital_ALT_TEXT.pdf.**

[206] The CMA market study July 2020 *Online platforms and digital advertising*, page 116: **https://assets.publishing.service.gov.uk/media/5fa557668fa8f5788db46efc/Final_report_Digital_ALT_TEXT.pdf.**

[207] **https://www.forbes.com/sites/gilpress/2018/04/08/why-facebook-triumphed-over-all-other-social-networks/.**

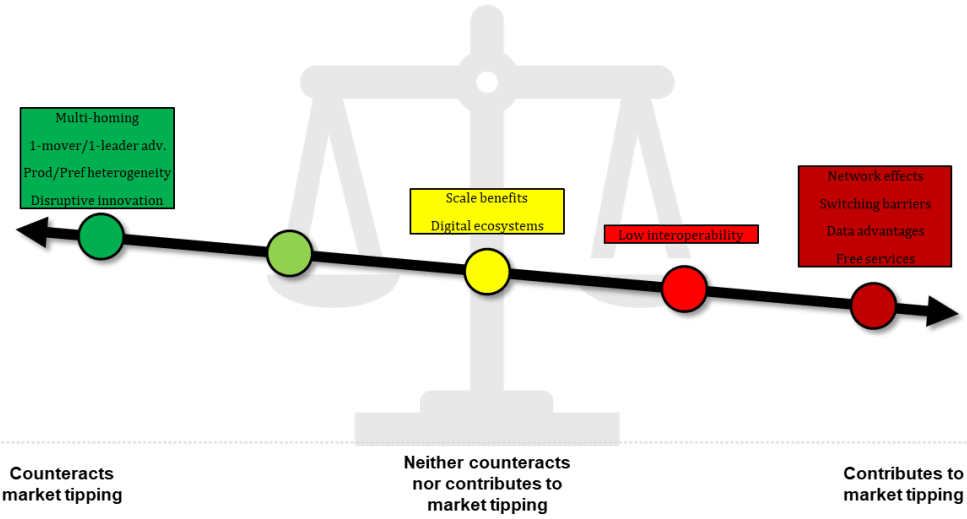
[208] In 2024 Facebook had a user share of 62 pct. **https://gs.statcounter.com/social-media-stats#yearly-2009-2024.**

Overall, the case shows that while network effects are a critical source of user value, they are not sufficient to cause market tipping. The market does not appear to have tipped in favour of one single platform in either of the possible market segmentations. This may be due to the presence of differentiated user preferences, low switching barriers, and the widespread prevalence of multi-homing, all of which enable multiple platforms to coexist and compete effectively.

The case further underscores the importance of market definition. The assessment of whether a market has tipped can depend on how broadly or narrowly the relevant market is defined. This is particularly relevant when evaluating the extend of single-homing versus multi-homing. According to the European Commission's Notice on the Definition of the Relevant Market, the relevant product market comprises all products that consumers regard as interchangeable or substitutable, based on their characteristics, prices, and intended use, while also considering the conditions of competition and the structure of supply and demand in the market.[209]

According to the European Commission the market can be defined as the market for social networking services. The DCCA's conclusion – that the market does not appear to have tipped – relies in part on the observation that multiple platforms currently serve different user needs. However, if the market was defined more narrowly, such that platforms like Facebook, Instagram, and TikTok were not considered part of the same market, the conclusion could potentially differ.

Figure 5.2 **Summary of market tipping factors in the market for social networking services**



Source: DCCA analysis.

[209] Commission Notice on the definition of the relevant market for the purposes of Union competition law (C/2024/1645).

Chapter 6
The Danish market for car resale platforms

6.1 Introduction

The DCCA has handled antitrust cases in which arguments regarding market tipping have been raised. One notable illustrative case concerned a collective boycott of the car resale platform "Bilbasen" by the Peugeot Dealer Association (*Peugeot Forhandler Foreningen*) in the Danish market for car resale platforms.

This case concerned a collective boycott which constituted a violation of the prohibition against anti-competitive agreements irrespective of whether the market had tipped or not. However, this case is illustrative of how the concept of tipping has been brought forth in a competition law context.

The Competition Council ruled that the Peugeot Dealer Association had violated the prohibition on anti-competitive agreements in Article 101 of the Treaty on the Functioning of the European Union and the corresponding provision in the Danish Competition Act. The Peugeot Dealer Association had adopted a collective boycott of Bilbasen, requiring Peugeot dealers to refrain from advertising their cars on Bilbasen in order to promote the competing platform "Biltorvet".[210]

The Peugeot Dealer Association argued that the Danish market for advertising on car resale platforms was characterised by a lack of effective competition. They claimed that Bilbasen held a dominant position in the market and was an unavoidable trading partner, that strong network effects protected Bilbasen from new entrants, and that the market therefore had tipped in favour of Bilbasen.

As a result, the Peugeot Dealer Association contended that the competing platform, Biltorvet, had no realistic chance of expanding or competing effectively with Bilbasen. According to the Peugeot Dealer Association, the Peugeot dealers were compelled to use Bilbasen in order to reach potential car buyers, as no viable alternative existed.

The Competition Council did not conclude whether the market had tipped or not. This was not necessary, as it disagreed with the Peugeot Dealer Association's claim that the resolution adopted by the Peugeot Dealer Association was incapable of restricting competition, regardless of whether the market had tipped or not.

The Council found that a collective boycott of Bilbasen was, by its very nature, capable of degrading the quality of Bilbasen's platform. Given that the value of a car resale platform largely depends on the number of users on both sides of the platform, a collective boycott on the dealer side, would likely reduce the number of potential car buyers on Bilbasen. This, in turn,

[210] See press release **https://en.kfst.dk/nyheder/kfst/english/decisions/20220223-the-danish-association-of-peugeot-dealers-collective-boycott-of-bilbasendk-is-illegal.**

could contribute to even fewer dealers advertising their cars for sale on Bilbasen, creating a reinforcing cycle.[211]

In other words, the Council concluded that promoting the adoption of a competing car resale platform, cannot involve degrading the quality of the incumbent platform through collective boycott.

6.2 The market for car resale platforms

A car resale platform is a digital service specialising in advertising and facilitating the sales of used cars similar to general marketplaces like "Den Blå Avis" and "eBay". Car resale platforms enable potential buyers to search for and compare a selection of used cars. The potential buyers can filter advertisements according to criteria such as model, condition, age, price, and specific features, thereby making the search process highly customisable. These platforms thereby offer transparency by allowing users to compare cars based on individual preferences.

Car resale platforms are offered as a free service to buyers, allowing them to browse advertisements for used cars at no cost. The majority of platforms are financed by dealers who pay to post each advertisement, although some are instead funded through revenue generated from banner advertising.

A car resale platform functions by enabling sellers to post advertisements for used cars and allowing potential buyers to browse these online advertisements in a structured and searchable format. The transaction itself does not take place through the platform; instead, the purchase is concluded directly between the buyer and the dealer, independent of the platform. Thus, a car resale platform can be defined as a vertical (specialised) online classified ad service (OCAS).[212]

In 2024, The EU Commission ruled in a case concerning Facebook Marketplace that the market for OCAS constitutes a distinct product market.[213] The OCAS market could potentially be further segmented into horizontal and specialised OCAS. However, in that case, the Commission left the question of further segmentation open, as it was not necessary to reach a definitive conclusion.

In the Bilbasen case, the DCCA defined the two relevant product markets as; i) the market for the sale of used cars, and ii) the market for advertising on car resale platforms.[214]

Market development
Bilbasen was the first car resale platform to enter the Danish market, and was established in 2000. The following year, in 2001, Biltorvet was launched by the Danish Automobile Dealer Association (Dansk Automobilforhandler Forening, D.A.F.), which is a trade association for car dealers. Initially, Biltorvet was accessible only to members of D.A.F. However, in 2004, the platform was opened to all used car dealers.

For professional dealers, car resale platforms were the primary channel for advertising cars, and was prioritised over alternative methods such as their own websites or broader online

[211] Konkurrencerådsafgørelse den 23. februar 2022: Kollektiv boykot af Bilbasen i Peugeot Forhandler Foreningen, para. 511.
[212] AT.40684 *Facebook Marketplace*, Commission decision of 14 November 2024, recital 459.
[213] AT.40684 *Facebook Marketplace*, Commission decision of 14 November 2024 recital 460.
[214] Konkurrencerådsafgørelse den 23. februar 2022: Kollektiv boykot af Bilbasen i Peugeot Forhandler Foreningen, para. 6.

marketplaces such as "Den Blå Avis" (the largest general online marketplace in Denmark). Traditional advertising methods, such as newspapers and magazines, also played a relatively minor role in reaching potential buyers. The effectiveness of these platforms was a key consideration for dealers, with success often measured by how quickly an advertisement resulted in a sale.

Between 2010 and 2015, Bilbasen was the largest and most widely used car resale platform in Denmark followed by Biltorvet and Bilzonen which had a significantly smaller user base.[215] A number of smaller portals also operated in the market, including AutoUncle and 123Auto, though their market shares remained limited. Notably, Bilbasen substantially outperformed both Biltorvet and Bilzonen in terms of user traffic. However, when looking at the number of advertisements from car dealers the numbers are more equally distributed. In 2014, the three largest car resale platforms had the same number of advertisements, but Bilbasen continued to maintain a considerable larger user base compared to the other platforms.[216]

In order to challenge Bilbasen's position, there was broad consensus among dealers, their associations, and industry organisations that a viable alternative platform was necessary. It was concluded that this could be achieved by strengthening an existing competing platform. As a result, dealers in the automotive sector were given the opportunity to invest in Biltorvet. This initiative aimed to raise capital to further develop and market Biltorvet and thereby increase the competitive pressure in the market.

6.3 Assessment of presence of market tipping factors

Network effects

The car resale platform market is characterised by indirect network effects, whereby a car resale platform becomes increasingly valuable to users as more dealers choose to advertise on the car resale platform.[217] Conversely, the more users a platform attracts – specifically in the form of potential buyers – the more attractive and commercially valuable the platform becomes to dealers wanting to advertise their used cars.

For example, Bilbasen benefits from a large user base because many dealers prioritise advertising on the platform in order to maximise their reach. The high number of advertisements, in turn, makes Bilbasen more attractive to potential buyers, further increasing its value for dealers. This mutually reinforcing dynamic exemplifies the indirect network effects present in the market.

However, the Competition Council's Decision highlights that data on user numbers across platforms does not reveal a consistent correlation between the number of potential buyers and the number of advertisements. For example, in 2013, both the number of buyers and advertisements increased on Biltorvet, with Biltorvet even surpassing Bilbasen in terms of the number of advertisements. Nonetheless, Biltorvet continued to attract significantly fewer potential buyers than Bilbasen. Similarly, in 2014, when both platforms had approximately the same number of advertisements, Bilbasen still drew a substantially larger user base than its competitor.

[215] Ibid, figure 3.3.
[216] Ibid, figure 3.4.
[217] Ibid, para. 68.

This indicates that while both platforms benefited from network effects through the number of dealers advertising, Bilbasen appeared to hold a stronger or more favorable position among buyers based on factors beyond network effects alone. Thus, while network effects are important, they alone do not fully explain why Bilbasen attracted more potential buyers than Biltorvet.

Single-homing

The use of one car resale platform does not restrict a user from switching between or using multiple platforms concurrently (i.e. multi-homing).[218] The purchasing of a used car is, for the vast majority, a significant financial decision, suggesting that users are likely investing time in exploring various platforms in order to find a car that best matches their preferences. However, user data indicates single-homing was more prevalent, with most users engaging with only one platform.

The actual extent of single- and multi-homing on the user side is not addressed in the Competition Council's decision. However, while users have the technical and practical ability to multi-home, the observed behaviour suggests a tendency toward single-homing, despite the high stakes of purchasing a used car which increases the likelihood of tipping.

Prior to 2014, a substantial number of dealers were only advertising on one car resale platform.[219] However, in 2014, the supply of used cars on Bilbasen and Biltorvet was essentially equivalent, leading to a shift in dealer behaviour. From this point onward, multi-homing among dealers became more common, indicating a shift in market dynamics. However, the decision did not include an analysis of the market after 2015.

Switching barriers

For dealers, switching barriers exist to some extent, primarily in the form of advertising costs and limited interoperability between different workstations. For byers switching barriers exist in the form of search costs, such as the time and effort required to find cars on an alternative platform, along with the cognitive effort needed in learning how to navigate and use a new platform.[220]

In 2012, many dealers initially switched from Bilbasen to Biltorvet but later returned to Bilbasen. This behaviour indicates that the switching barriers faced by dealers were not substantial, as they were evidently willing and able to change platforms in response to perceived benefits.

Scale benefits

In the Decision the Peugeot Dealer Association argued that, in order for Biltorvet to effectively compete with Bilbasen it would need to invest substantially in order to match Bilbasen's scale.[221] This claim indicates that scale benefits potentially influence a care resale platforms ability to compete.

However, the Dealer Association did not clearly specify the nature of the scale advantages enjoyed by Bilbasen, nor did it provide evidence as to whether these scale advantages had an impact on the likelihood of tipping this market.

[218] Ibid, para. 74.
[219] Ibid, para. 89.
[220] Ibid, para. 684.
[221] Ibid, para. 232.

Data advantages
Data-enabled learning does not appear to be a significant competitive factor on this market. There were, for example, no indications that Bilbasen's larger user network afforded it any data-driven benefits that could be leveraged to e.g. offer a more customised user experience, or enhanced platform functionality. Hence, the information about the market suggests that this market factor has not impacted the likelihood of tipping.

Ecosystem (complementary services)
The two largest car resale platforms have developed complimentary services to their car resale platforms. In contrast, the smaller platforms do not offer such complementary services.

To post an advertisement on a car resale platform – whether as a professional dealer or private seller – the dealer must first create the ad. Both Bilbasen and Biltorvet offer digital tools for creating those ads. Additionally, both platforms offered so-called seller workstations alongside their car resale platforms (Bilbasen through Bilinfo and Biltorvet through AutoDesktop). These platforms are designed to support dealers with functionalities such as pricing tools, customer and sales management modules, etc.

The seller workstations include a broad range of functions which can be divided into two main functions: an ad creation tool and a dedicated seller workspace. It was possible for the dealers to only use the ad creation tool. The other car resale platforms did not offer seller workstations either.

The complementary services offered by Bilbasen an Biltorvet does not appear to have impacted the likelihood of the market tipping, especially given that the workstations are, to some extent, interoperable across the platforms.

First-mover advantage
It can be argued that Bilbasen gained a substantial advantage in the market by being the first car resale platform in Denmark. This is supported by the fact that despite Biltorvet reaching a seller network of a comparable size, the buyer network remained largely on Bilbasen. When Bilbasen was launched in 2000, it was open to both professional dealers and private sellers, allowing it to offer a broad and diverse supply of used cars. It appears that this has been instrumental in attracting the large user base on both sides of the platform.

In contrast, when Biltorvet was introduced in 2001 it was exclusive to members of D.A.F. thereby excluding a number of potential sellers from advertising on the platform. It can be argued that the restricted initial supply on Biltorvet may have contributed to Bilbasen gaining many users in the initial market phase.

Thereby, the advantages Bilbasen enjoyed by being the first car resale platform on the market likely increased the likelihood of market tipping.

Free services
Bilbasen and the other car resale platforms are available free of charge to buyers.[222] For dealers the pricing structure differ across car resale platforms. Some platforms – such as Bilbasen and Biltorvet – operate under a business model where the dealers pay to advertise on the

[222] Ibid, para. 60.

platform.[223] Other platforms are financed through banner advertising allowing the dealers to use the platform service at no cost.

The variation in pricing models across car resale platforms may influence dealer behaviour, particularly in terms of platform preferences, and multi-homing decisions. However, in this specific case, the difference in pricing models does not appear to have played a significant role in influencing the likelihood of market tipping.

Product and preference homogeneity

There is no significant differentiation on the market for car resale platforms at least not from the perspective of buyers. The competing car resale platforms offer largely the same features and functionalities with limited possibility for distinction. For example, both Bilbasen and Biltorvet enables buyers to receive automatic notifications for when advertisements matching their criteria is listed.[224] To varying degrees the platforms also offer user reviews, news articles, guides, and partnerships with third-party services, such as financing and insurance providers.

Overall, the market appears to exhibit a high degree of preference homogeneity among the users. The different car resale platforms largely fulfil the same needs for the users. This low degree of differentiation and high degree of homogeneity contributes to single-homing behaviour as users have limited incentives to switch between platforms.

The combination of a low degree of differentiation and high user preference homogeneity increases the likelihood of market tipping by making it difficult for competing platforms to distinguish themselves from the incumbent – Bilbasen.

Interoperability

Car resale platforms are only interoperable to some extent. Dealers could only advertise on Bilbasen if their ad was created using the Bilinfo workstation.[225] Conversely, it was possible to advertise on multiple car resale platforms, including Biltorvet, regardless of where the ad was created (i.e. both ads created in Bilinfo and AutoDesktop).

However, the ad creation tool in Bilinfo was available to dealers free of charge meaning there were no monetary barriers to creating advertisements for Bilbasen. In contrast, the ad creation tool in AutoDesktop had a monthly cost of DKK 59 (roughly equivalent to EUR 8 per month).[226]

It was possible for the dealers to use Biltorvet or AutoDesktop without simultaneously using the other service which indicated that the services were not interdependent. In contrast, the requirement to use Bilinfo in order to advertise on Bilbasen implies a lack of interoperability that could contribute to a lock-in effect for the dealers.

On the dealer side, the market for car resale platforms is characterised by both small and large players. In combination with the indirect network effects, this lock-in effect can function as an expansion barrier for competing platforms and thereby, increase the likelihood of tipping.

[223] Ibid, para. 66.
[224] Ibid, para. 63.
[225] Ibid, para. 97.
[226] Ibid, para. 94.

Innovation from competitors

There is no mention of innovation from competitors in the Competition Counsil's decision. However, it is mentioned that if a car resale platform had introduced innovative features or services then the market might have "tipped" in favour of that car resale platform.[227]

However, in a market characterised by a high degree of preference homogeneity and where the demand is already covered by multiple platforms, the returns to innovation from a competitor is likely to be less pronounced, compared to a market with a higher degree of preference heterogeneity. In such settings, potentially valuable innovations may fail to generate sufficient user movement to alter the market dynamic.

The lack of significant innovation from competitors suggests that no platform succeeded in launching features strong enough to drive market tipping. Combined with the high preference homogeneity and well-covered demand, the potential of innovation as a disruptive force in this market was likely constrained.

6.4 Conclusion: Assessing potential market tipping in retrospect

In 2014, Bilbasen received five times more visits than Biltorvet, despite both platforms having a similar number of advertisements (the collective boycott may have inflated the number of advertisements on Biltorvet during the relevant period). However, in this specific case the Competition Council did not conclude whether or not the market had tipped.

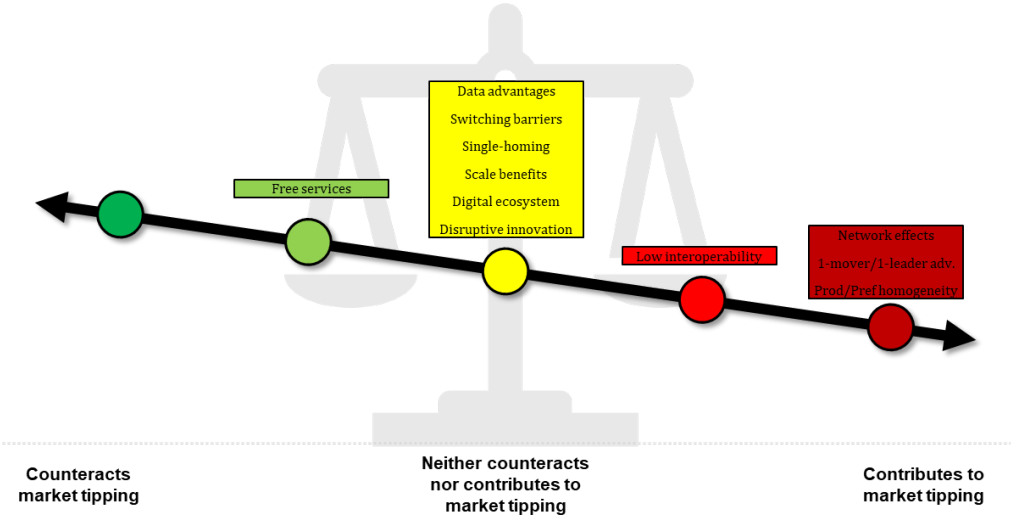
The market displayed characteristics commonly associated with tipping including indirect network effects, first-mover advantages, and a high degree of preference homogeneity. These characteristics can contribute to a market tipping by reinforcing the market position of a leading platform and raising entry barriers for competitors.

Bilbasen appears to have established a strong user base, potentially as a result of its early market entry. In this type of market, early user acquisition appears to be a critical factor as network effects may act as a barrier to entry for competing platforms. Additionally, in a market characterised by homogeneous user preferences, the scope for competing platforms to attract users through innovation or differentiation may be limited.

Figure 6.1 summarises and illustrates the presence and strength of the market tipping factors in the Danish market for car resale platforms.

[227] Ibid, para. 503.

Figure 6.1 **Summary of market tipping factors in the Danish market for car resale platforms**



Source: DCCA analysis.

Chapter 7
Foundation models for generative artificial intelligence

7.1 Introduction

The previous case studies have been retrospective to assess the extent to which the theoretical framework on market tipping can be usefully applied to explain observed market outcomes. However, a benefit of a more structured approach to market tipping is also to allow for a forward-looking analysis, e.g. to enable an assessment of how likely it is that a market will tip in the foreseeable future.

Critically, while it is relatively unproblematic – with the benefit of two decades of hindsight – to conclude that the search engine market has tipped in favour of Google, such an approach may not be viable in the context of competition law enforcement. Waiting a certain number of (many) years before being able to assess whether a market has tipped or not could render timely and effective intervention impossible.

Therefore, as a final case study, the DCCA takes a brief and preliminary look at the market for generative artificial intelligence (AI). The competition debate has centered on concerns that the market for foundation models may tip into a monopoly or oligopoly, with the current large tech firms as market winners.[228] There are also concerns that incumbent tech firms may be able to leverage strong market positions in the AI foundation model market to entrench existing strongholds in the vast number of adjacent digital markets where those models can be deployed. However, there are also suggestions that the rollout of AI solutions may have the potential to disrupt existing markets, or in some cases even to reverse tipping dynamics.[229]

7.2 Product description

According to the International Organization for Standardization (ISO), the technical definition of AI is: "*a technical and scientific field devoted to the engineered system that generates outputs such as content, forecasts, recommendations or decisions for a given set of human-defined objectives*".[230] ISO further explains that AI is a practical tool, which is as good as the algorithms and machine learning techniques that guide its actions. For an AI system to perform at a high level it must be trained on large volumes of data and repetition: "*It simply learns to analyse large*

[228] See for example OECD, 2024, *Artificial Intelligence, Data and Competition*, **https://www.oecd.org/en/publications/artificial-intelligence-data-and-competition_e7e88884-en.html**. In a speech on generative AI in June 2024, Commission Executive Vice President Vestager stated that "*A major risk we see is big tech players leveraging their market power across different markets within their ecosystem. Concentration is especially high at the top of the value chain, where large foundation models are trained to be used in various applications.*", see **https://ec.europa.eu/commission/presscorner/detail/en/speech_24_3550**.

[229] Keegan, M., 2024, *Will the rise of AI search challenge Google's dominance?*, **https://www.mmm-online.com/home/channel/will-the-rise-of-ai-search-challenge-googles-dominance/**.

[230] ISO/IEC 22989:2022, available at **https://www.iso.org/standard/74296.html**.

amounts of data, recognize patterns, and make predictions or decisions based on that data, continuously improving its performance over time".[231]

Generative AI is the collective description of digital models that are capable of generating content – such as text, image, sound, video or computer code – based on the instructions (prompts) it receives.[232] According to ISO, generative AI is the "next level" of AI, in the sense that the generative AI models go beyond "*mere data processing*" and is capable of "*learning, reasoning and problem-solving*".[233] Whereas traditional AI systems are designed to analyse data and make predictions based on those analyses, generative AI is able to create (generate) new data that resembles the data it has been trained on. Hence, generative AI models, when generating content, display human-like intelligence in the sense that they create output that are not predetermined responses to inputs.

According to the OECD, creating a useful generative AI application requires access to data, know-how and computing power, cf. Figure 7.1.[234] On this base, a provider typically develops a foundation model, trained on large amounts of data and fine-tuned through e.g. human feedback (the process could for example include humans informing the model if it has correctly identified a certain feature from an image, or evaluate to what extent the model's text output is correct and relevant). Such training requires significant computing resources, in order to process the data and algorithms. Foundation models can serve as the basis for developing and deploying specific AI-powered applications, such as the generative AI chatbot ChatGPT, which is built on the GPT foundation models (large language models).

France's Autorité de la Concurrence further notes that there are two key phases in generative AI modelling – training and inference:

- "***Training****: the initial learning process of a model (often called "foundation model", which includes large language models [LLMs]), during which its parameters, known as "weights", are determined. Training requires both significant computing power and a large volume of – generally public – data. The training phase may be followed by fine-tuning, during which the model is adapted to a specific task, such as answering end users' questions, or to a specialised dataset (e.g. legal or health-related data). Fine-tuning is generally based on a smaller, proprietary dataset and may involve human expertise.*
- ***Inference****: the use of the trained model to generate content. The model can be made accessible to users via specific applications, such as Open AI's ChatGPT or Mistral AI's Le Chat, or APIs for developers. The computing power required depends on the number of users. Unlike many digital services, the marginal cost of generative AI is not negligible, given the cost of the computing power required. New data that was not used for training may be added during the inference phase, in order to ground the model in recent data, such as news articles."*[235]

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[231] ISO, *What is artificial intelligence (AI)?*, available at **https://www.iso.org/artificial-intelligence/what-is-ai**.

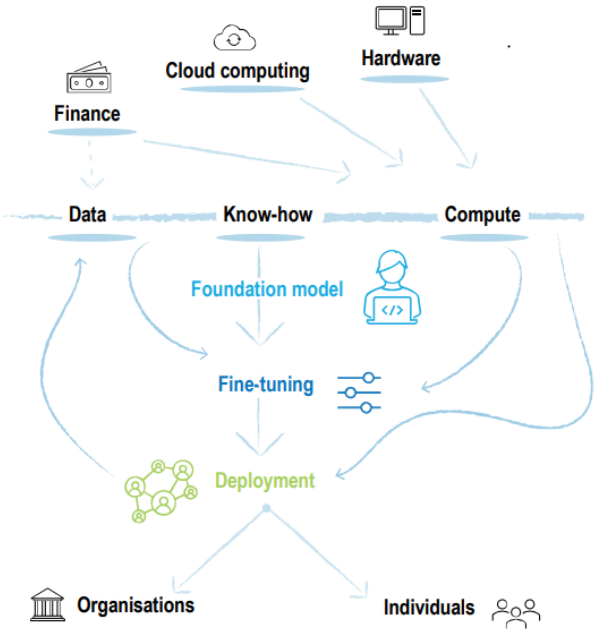
[232] Autorité de la Concurrence, 2024, *Generative artificial intelligence: the Autorité issues its opinion on the competitive functioning of the sector*, **https://www.autoritedelaconcurrence.fr/en/press-release/generative-artificial-intelligence-autorite-issues-its-opinion-competitive**.

[233] ISO, op cit.

[234] OECD, 2024, *Artificial intelligence, data and competition*, OECD Artificial Intelligence Papers No. 18.

[235] Autorité de la Concurrence, 2024, *Opinion 24-A-05 of 28 June 2024 on the competitive functioning of the generative artificial intelligence sector*, p. 2.

Figure 7.1 **Simplified illustration of the generative AI value chain**



Note: This diagram is a significant simplification of the key steps in the generative AI value chain with key inputs for competition identified by the OECD.

Source: OECD, 2024, Artificial intelligence, data and competition, OECD Artificial Intelligence Papers No. 18, p. 26.

The possibilities of generative AI are potentially vast. According to Implement Consulting Group, widespread adoption of generative AI could lead to increased productivity for people who work with (i.e. use) such solutions, freed-up time since generative AI can automate work streams currently requiring human involvement, and subsequent adaptation of that freed-up time for other work streams.[236] This is especially relevant for sectors and occupations that involves creation and innovation[237]

Despite its rapid development, the market for generative AI appears to still be in a relatively early stage of development. As noted by Aaron Hallmark: "*If AI is the new electricity, then ChatGPT is the new lightbulb*".[238] While the lightbulb brought significant productivity gains (e.g. factories could be open beyond sunset), it was merely the beginning for electricity's impact on the economy.

[236] Implement Consulting Group, 2024, *The economic opportunity of generative AI in the EU*, see **https://implementconsultinggroup.com/article/the-economic-opportunity-of-generative-ai-in-eu27**. The report was commissioned by Google.
[237] Forbes, op cit.
[238] **https://fait.ai/news-blog-ai-is-the-new-electricity-chatgpt-new-lightbulb/**.

7.3 Market description

Given that data, know-how, and computing power are the central factors required to develop and fine-tune generative AI foundation models and applications, one might expect that the market would resemble other digital markets in which digital products or platforms are central. Nonetheless, there is currently a plethora of different market players developing and providing both foundation models and generative AI applications.[239]

France's Autorité de la Concurrence notes that Alphabet and Microsoft are active across the entire generative AI value chain, encompassing AI infrastructure, AI modelling and AI deployment. In contrast, Amazon, Apple, Meta, and Nvidia are active within specific layers of the value chain.[240]

A central and relevant feature in the market for generative AI are partnerships between large incumbent tech firms and newer market players. As of April 2024, the UK Competition and Markets Authority (CMA) had identified at least 90 partnerships involving the so-called GAMMAN firms (Google, Amazon, Microsoft, Meta, Apple, and Nvidia).[241] These partnerships may vary in form and purpose, such as agreements that provide smaller AI developers with access to the large incumbent's computing resources. The CMA notes that these partnerships may bring competitive benefits, but also that they are: "*vigilant against the possibility that incumbent firms may try to use partnerships and investments to quash competitive threats, even where it is uncertain whether those threats will materialise*".[242]

The OECD concludes that: "*market dynamics are still in a state of flux as are as companies rush to innovate*" and that their report "*simplifies the sector to describe three key stages, training foundation models, refining them, and then deploying for use, but it could be possible to cut the market in other ways*".[243] This report will follow the OECD's simplification of the sector in the following section, where it discusses the various market features that impacts the likelihood of market tipping, in the market for generative AI foundation models.

7.4 Assessment of presence of market tipping factors

Network effects

The OECD, the Autorité de la Concurrence and the CMA, among others, all mention that insofar as network effects are present in generative AI markets, it could lead to market tipping. However, it appears unclear at this stage to what extent network effects are likely to be present.

The foundation models for generative AI solutions, such as Large Language Models, are trained on vast amounts of data. As users interact with and utilise the AI solutions, it is possible for the providers/developers to use such data to further improve the foundation models. However, users primarily interact *with* the AI solution itself, rather than with other users *via* the AI solution. Consequently, similar to the search engine market discussed in chapter 3,

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[239] According to the market insight database Tracxn, there are over 84,000 companies operating in the field of artificial intelligence in December 2024, see **https://tracxn.com/d/sectors/artificial-intelligence/__cbMnXfS2GfFo4Vi2dxZyUy7l4O8WyzVYLseb9keW5cI/companies**.

[240] Autorité de la Concurrence, 2024, *Opinion 24-A-05 of 28 June 2024 on the competitive functioning of the generative artificial intelligence sector*. The Autorité further notes that the AI infrastructure layer consists of computing power (AI chips, cloud services and public supercomputers), data (public and proprietary, the latter potentially licensed from a third party) and skills, much like the OECD has concluded.

[241] UK Competition and Markets Authority, 2024, *AI Foundation Models Update Paper*.

[242] Ibid, supra 45, p. 18.

[243] OECD, 2024, op cit., p. 55.

there is not a strong *prima facie* suggestion that the individual user's value of a AI solution or foundation model increases directly as a result of other users using the same solution (except that a large user base enables the provider to access more/better data than competing providers, which can be used to improve the AI models performance, potentially leading to an incontestable superiority – this is discussed further in the section on data advantages).

From a developer perspective, network effects may be more direct. For example, if open-source foundations models are widely adopted, and developers build complementary or interoperable solutions based on the same underlying models, network effects may materialise – potentially at a rapid pace.

Single-homing and multi-homing

The market for generative AI is still so nascent that it is difficult to assess the extent to which users will tend towards single- or multi-homing. Currently, for end-users using AI solutions to generate content e.g. text, images or computer code, it appears to be relatively easy to use multiple solutions – and thus different foundation models – without preventative multi-homing costs or inconveniences. For example, if a user is not satisfied with the output produced by one AI solution, it is relatively easy to switch to an alternative solution, or to utilise several solutions simultaneously to identify the best available output for a given task. However, it is likely that as a user's need for more advanced AI functionality grows, the costs associated with multi-homing will increase, given that access to more advanced AI solutions typically involves higher costs than access to more basic solutions.[244]

Furthermore, over time, it may be that user familiarity with specific generative AI solutions may reduce the attractiveness of multi-homing. This would typically be the case insofar as the refined version of the foundation model underpinning the AI solution over time learns what type of output the individual user desires, i.e. the AI solution over time becomes more and more personalised.

From a business user perspective, there appears to be a more direct reason for single-homing. Firms that incorporate specific AI solutions – built on specific foundation models – into their internal or external software applications may find it difficult to switch to a different model. It is possible that an AI-powered software developed by or for an individual firm may lead the firm to find it difficult to move that software to run on a different foundation model – or to integrate distinct AI solutions built on different foundation models – without incurring substantial costs.

Switching barriers

As discussed in the previous section on multi-homing, there are currently limited indications of substantial switching barriers for private users. Many of the currently popular generative AI applications, such as ChatGPT, are available free of charge for a basic version of the application, although premium versions are subject to payment.

In other situations, presumably more relevant for business users, access to AI solutions may be included in an IT service package, such that switching to a different foundation model is not possible unless that foundation model can also support the other services the business user

[244] For example, in February 2025, it is possible to access OpenAI's ChatGPT as a private user for free, for €23/month ("Plus") or €229/month ("Pro") – i.e. "Pro" access is almost ten times costlier than "Plus" access.

requires. Typically, switching barriers are higher between ecosystems than between individual applications.[245]

This indicates that while private users currently face relatively low switching costs, business users with an IT ecosystem may encounter more substantial switching barriers.

Scale benefits

There are potentially large and significant scale effects present in the market for generative AI. The OECD notes that because development costs are high at the foundation model layer of the value chain, economies of scale are likely to be present. Training and developing a foundation model require substantial computing resources, in addition to large amounts of high-quality data and know-how. Given that computing resources are both scarce and expensive, access may be restricted to actors with a certain scale. OECD further notes that: "*if providers were to adopt licensing models, then there may be relatively few running costs, implying substantial economies of scale*".[246] However, it is unclear how and to what extent foundation models (or access to them) will be made available to third party developers on a license basis.

Thus, scale benefits in the development of foundation models may be reflected in the partnerships between large incumbent tech firms and newer AI developers, i.e. that the large incumbent provides the scale of operations that the (smaller) developer lacks. However, such partnerships may also reflect that scale does not necessarily lead to market tipping, insofar as partnerships (or alternative forms of access to the necessary computing power, particularly through cloud services), allow smaller players to compete in the market.

Data advantages

The ability to access and utilise relevant data is a central feature of the market for developing and maintaining foundation models for generative AI. Thus, it appears that it has the potential to contribute to market tipping. It is a fact that developing a useful foundation model requires access to large volumes of data, to the extent that there are disputes among rights holders and AI developers regarding the lawful use of data.[247]

There is also reason to believe that large incumbent tech firms – many of which have been the subject of earlier case studies in this report where data played a central competitive role – have access to data that will grant them important advantages in the market for developing foundation models for generative AI. These advantages are not limited to data but also include other benefits, such as distribution channels which are further explored in the following section on ecosystems.

Access to a large user base is likely to lead to better access to data, which can be used to further improve a foundation model and/or the solutions that are built upon it. As in the case of the search engine market, a provider that manages to capture a large user share may accumulate such a data advantage and outperform, and outcompete its competitors, e.g. by addressing potential weaknesses relative to other foundation models/solutions quicker than its competitors. It may also enable more personalised AI solutions, which could prove valuable as the market develops.

[245] OECD, 2024, op cit.

[246] OECD, 2024, op cit., p. 29.

[247] Pope, A., 2024, NYT v. OpenAI: The Times's About-Face, Harvard Law Review, available at **https://harvardlawreview.org/blog/2024/04/nyt-v-openai-the-timess-about-face/**.

Access to data may also be a decisive factor for an innovative developer who is considering partnering with a larger market actor (e.g. choosing the partner that, with its access to relevant data, may be best placed to unleash the potential of the innovative developer), such that other factors (e.g. financial compensation) become less relevant factors.

Ecosystem

Ecosystems of products and services can potentially be a significant contributor to market tipping in the market for generative AI foundation models. Currently, developing a foundation model is costly and it is important for developers to have a strong business case for how to recoup the substantial investments. In this regard, tech firms with established distribution channels have a clear advantage. Not only do large tech firms benefit from large user bases for individual distribution channels (scale), but they also have several services and use cases for deploying generative AI solutions (scope).

The OECD notes that "*there appears to be potential for strong interaction between AI applications and other digital services, such as digital platforms*".[248] For example, Microsoft can integrate Copilot in its Office suite and other services, Apple can embed generative AI solutions within its ecosystem of devices and services, and Google can offer its Gemini model-powered solutions across its service portfolio. The Australian Competition & Consumer Commission notes that: "*The unyielding dominance of Google Search in Australia's online search market has placed the company in a prime position to leverage generative artificial intelligence into its search offerings and outpace rivals [...]*".[249] In the early months of 2025, Microsoft rolled out the Copilot AI service into consumer subscriptions for Microsoft 365 applications – with price increases.[250]

While it is currently possible to access many AI solutions as standalone offers, the OECD notes that, if AI could be deployed as part of an operating system or a digital platform, standalone providers would likely find it particularly hard to compete: "*As ecosystems broaden, and as the capability of generative AI improves, the potential to leverage a strong position from currently established platforms may grow as the value of being within a system increases*."[251]

Furthermore, focusing on the upstream part of the foundation model market, the French Autorité de la Concurrence pays particular attention to the role of hyperscale cloud providers: "*The cloud appears to be the only way to access the computing power needed to train models*".[252] With the exception of firms with sufficiently large in-house datacenters (the Autorité mentions Samsung and Meta as examples), developers cannot develop or train their foundation models without access to the necessary computing powers offered by cloud providers. In other words, cloud computing services appear to possibly be an indispensable component for developing foundation models. They note that there are concerns that cloud providers may leverage their position to enter into exclusive agreements with developers, thereby making the latter dependent on the former's cloud services and possibly also their distribution channels (i.e. that the developer's AI solutions be deployed via the cloud provider's other service offerings). The CMA similarly notes that: "*if a firm were to have market power in one of those upstream*

[248] OECD, 2024, op cit., p. 24.

[249] mLex, 4 December 2024, *Google Search's AI-data dominance creates entry barriers, Australian watchdog warns*, referring to ACCC, 2024, *Digital platform services inquiry, Interim report 9: Revisiting general search services*.

[250] Telecompaper, 17 January 2025, *Microsoft rolls out Copilot AI on consumer 365 subscriptions*, available at **https://www.telecompaper.com/news/microsoft-rolls-out-copilot-ai-on-consumer-365-subscriptions--1524812**.

[251] OECD, 2024, op cit., p. 34.

[252] Autorité de la Concurrence, 2024, op cit., p. 5.

markets, it could provide the ability and incentive to foreclose downstream rivals from computing resources".[253]

Recalling the OECD's notion that generative AI requires data, computing power and know-how, the fact that the largest cloud providers also have access to large amounts of data, puts them in an even more advantageous position. The DCCA considers that the role of ecosystems will be of particular interest to observe, when assessing the risk of tipping in generative AI markets.

First-mover advantages

There appears to be a potential role for first-mover advantages to materialise into significant competitive benefits in the market for generative AI. This is particularly the case insofar as user data collected early can be used to further improve models and solutions.

The OECD specifically notes that with regards to know-how (i.e. labour with the necessary skills to develop generative AI models and solutions), there is substantial scarcity. Hence, first-movers who are able to attract and retain the few, highly sought-after, employees may enjoy substantial advantages since competitors may be less attractive to work for younger, skilled employees. However, the OECD notes that: "*how much of a bottleneck staff become is unclear, although one might expect demand and supply to balance over the longer term*".[254] It could, in this regard, be of particular interest to pay attention to any anti-poaching agreements[255] put in place by major players in the generative AI market.

Free services

As noted above, there are different ways for providers to commercialise their AI solutions. Some solutions are made available free of charge, others are offered at a standalone price, and others are part of an integrated software package. Both the OECD and the Autorité de la Concurrence highlights that the "freemium" model is not uncommon, where users can access a basic version free of charge, while access to more advanced versions require payment.

The availability of open-source models reduces barriers to entry in the application layer of the AI value chain.[256] In generative AI, there are different levels of openness, where some model developers publish their weights but keep aspects such as the code, model architecture and training data confidential, while others publish all these variables. Typically, non-commercial actors publish all components, whereas commercial developers publish the weights of their smaller models, but keep their most powerful models proprietary.

Open-source models that are free to use enable more competition in the downstream part of the generative AI value chain. The Autorité notes that there were hundreds of foundation models on the market as of June 2024, the number of fine-tuned models (see Figure 7.1) each month can be counted in the tens of thousands.[257]

However, the Autorité notes that open-source is not a guarantee of effective competition in the market. Access conditions may still cause competitive harm.[258] For example, a provider of an open-source model may restrict developers from using the model to compete directly with the

[253] UK Competition and Markets Authority, 2024, op cit., p. 32.
[254] OECD, 2024, op cit., p. 35.
[255] European Commission, 2024, *Antitrust in labour markets*, Competition Policy Brief, Issue 2 May 2024.
[256] Autorité de la Concurrence, 2024, op cit.
[257] Ibid, supra 185, p. 53.
[258] Ibid, p. 72.

provider's own AI solutions. Furthermore, an open-source provider may change their open-source model to a proprietary model, once it has attracted a sufficiently large developer base, thereby the developers have become locked-in to their model.

Product and preference homogeneity

The extent to which there will be sufficient differentiation and preference heterogeneity in the generative AI market is too early to determine. However, it has the potential to be the key market feature that either tips the markets or prevents them from doing so. As discussed, several market characteristics – such as access to data, ecosystems of input and deployment channels or scale effects – present a substantial risk of market tipping. Thus, if it turns out that one provider's foundation model (or family of foundation models) is able to satisfy a large share of user and developer demand, there would be significant risk of the market tipping.

However, in the short term, it appears unlikely that a single foundation model could satisfy all or even most use cases in the market for generative AI. Foundation models for e.g. text, image, video, sound or code generation are likely to have different requirements, and for one provider to dominate all such segments is *prima facie* unlikely.[259] A more apparent risk is that individual market segments may tip in favour of specific providers (i.e. that one foundation model provider would be "the" large language model, akin to Google Search being "the" general online search engine or Chromium being "the" web browser engine). The DCCA, along with most others, are currently not in a position to predict to what extent this is a likely outcome.[260]

Interoperability

The OECD notes that "*interoperability and portability of AI solutions may be a key question going forward*".[261] In particular, a lack of interoperability may amplify the tipping effect arising from e.g. data and ecosystem advantages of larger tech firms, insofar as it restricts user's ability to freely choose between different foundation models and AI solutions.

More directly, a lack of interoperability may also prevent users from using multiple AI solutions built on different foundation models in combination, which may further entrench market positions of larger providers, e.g. such that a niche solution with a specific function cannot be added on top of a larger bundle of integrated AI-powered software solutions. The OECD further notes that both vertical and horizontal interoperability are relevant to consider. In addition to horizontal interoperability, a lack of vertical interoperability may enable upstream providers (e.g. those with access to sufficient computing resources) to foreclose downstream competition, which could be a strategy to tip a market.

Innovation

Currently, there is strong and continuous innovation in the generative AI market. As previously noted, generative AI appears to be in the very early stages of its rollout into the economy and everyday life, with no signs of it slowing down. Indeed, the opposite appears to be true: the Autorité de la Concurrence shows that the number of new models published on the Hugging Face open-source collaboration platform has been steadily rising from fewer than 5,000 in April 2022 to just under 25,000 in March 2024.[262]

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[259] See e.g. Financial Times, 26 July 2023, *Adam Selipsky: There will not be one generative AI model to rule them all.*

[260] The Director-General for DG COMP, Mr. Olivier Guersent, stated in January 2025 that: "*he didn't see any gatekeeper in this area, since the market for AI models is highly competitive with hundreds of competing companies*", according to Bertuzzi, L., 10 Feb 2025, *Tech companies should see tighter AI competition rules, EU countries say*, mLex.

[261] OECD, 2024, op cit., p. 32.

[262] Autorité de la Concurrence, 2024, op cit., p. 53.

However, the prospects of continued innovation and market tipping appear to go in an inverted hand-in-hand relationship. If intense innovation continues, markets are less likely to tip, provided that other market factors are not strong enough to e.g. lock users into individual providers. Conversely, if other market factors are strong enough, tipping may occur, which could severely dampen innovative efforts.

Throughout this case study, it has been emphasised that it is difficult to predict which specific market factors will evolve in the generative AI market. However, the future pace of innovation appears the most uncertain. In the short term it appears that innovation will continue to be rapid, given the early stages of generative AI and its deployment across society. For instance, (only) 8 pct. of EU firms reportedly used AI technologies in 2023, suggesting that there is still room for more innovation and market development.[263]

As an example, during the early months of 2025, Chinese AI start-up DeepSeek made headlines when it released an AI model seemingly as capable as OpenAI's ChatGPT, but considerably cheaper to develop and operate. One immediate effect was that markets swiftly revised their valuations of the "incumbent" American tech firms and called "American AI dominance" into question.[264] Time will tell how the market will shape, but DeepSeek's entry and impact suggests that innovation in the AI field has substantial disruptive potential.

7.5 Conclusion: Clear potential risks of market tipping, but unclear magnitude thereof

While generative AI may not parallel the transformative impact of the lightbulb during the electrical transformation, it is clear that markets are still in the early stages of market development. Hence, the OECD concludes that: "*it is too early to assess competition issues in the AI sector with authority, and to know how realistic fears on the future of competition are*".[265]

The DCCA considers that some market factors that can lead to tipping are more discernible than others, at this point in time. For example, it appears likely that data-driven learning (access to large amounts of relevant data) and ecosystems of digital services and products are two market features that *prima facie* warrants particular attention when analysing whether AI foundation model markets are likely to tip or not.

In addition, the DCCA considers that it may be of particular importance to observe the market development regarding product differentiation and preference heterogeneity. If the market appears to turn into a situation where one, or only a few, foundation models become the default for the majority of AI applications, this signal an increased risk of market tipping in the foundation model layer. In this context, it may be relevant to consider network effects on the developer side of the market, i.e. to observe if there is a tendency for developers to work with one specific foundation model because many others are also using it.

In addition to the market factors listed above, it appears to be important to consider access to critical inputs beyond data, computing power and know-how. There are indications that larger players in the generative AI foundation model market may receive preferential access to

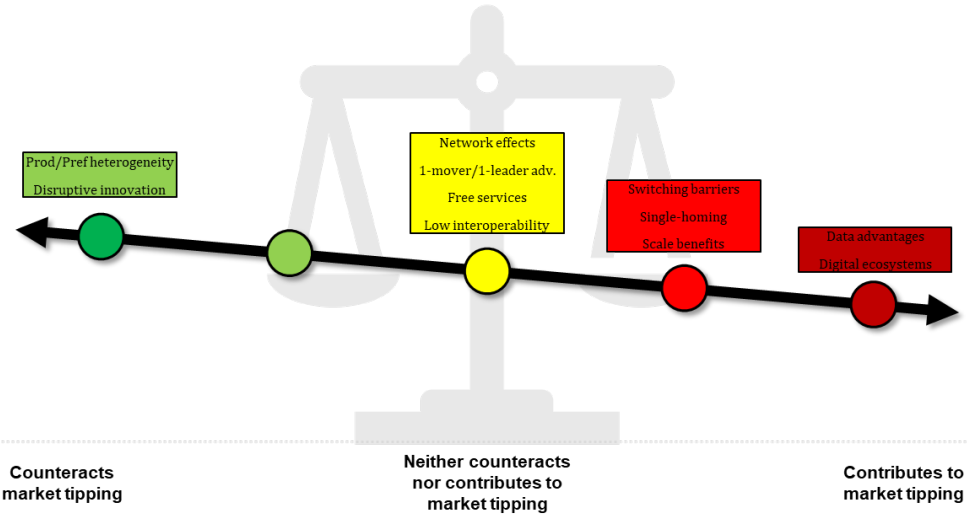
[263] Eurostat, *Use of artificial intelligence in enterprises*, Statistics Explained, available at **https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Use_of_artificial_intelligence_in_enterprises&oldid=567417**.
[264] See for example BBC News, 4 February 2025, *DeepSeek: The Chinese AI app that has the world talking*, available at **https://www.bbc.com/news/articles/c5yv5976z9po**.
[265] OECD, 2024, op cit., p. 55.

critical and scarce inputs, such as advanced chips, thereby leaving smaller disadvantaged due to limited or delayed deliveries.

These preliminary focus areas align with the conclusions drawn by the OECD: "*There appear to be some reasons to think that generative AI may not possess all of the characteristics as seen in digital markets that led to tipping, such as less clear network effects and more ambiguous economies of scale. This does not mean that there are not some factors that could lead to "winner takes all/most" dynamics*".[266] Thus, while the absence of significant network effects may prevent markets from tipping *stricto sensu*, there are factors in the market for AI foundation models suggesting a risk that markets may become highly concentrated with limited contestability.

Figure 7.2 summarises and illustrates the preliminary assessment of the presence and strength of the market tipping factors in the market for foundation models for generative AI.

Figure 7.2 **Summary of the preliminary assessment of market tipping factors in the market for foundation models for generative AI**



Source: DCCA analysis.

[266] Ibid.

Chapter 8
Literature

8.1 Literature list for chapter 2

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